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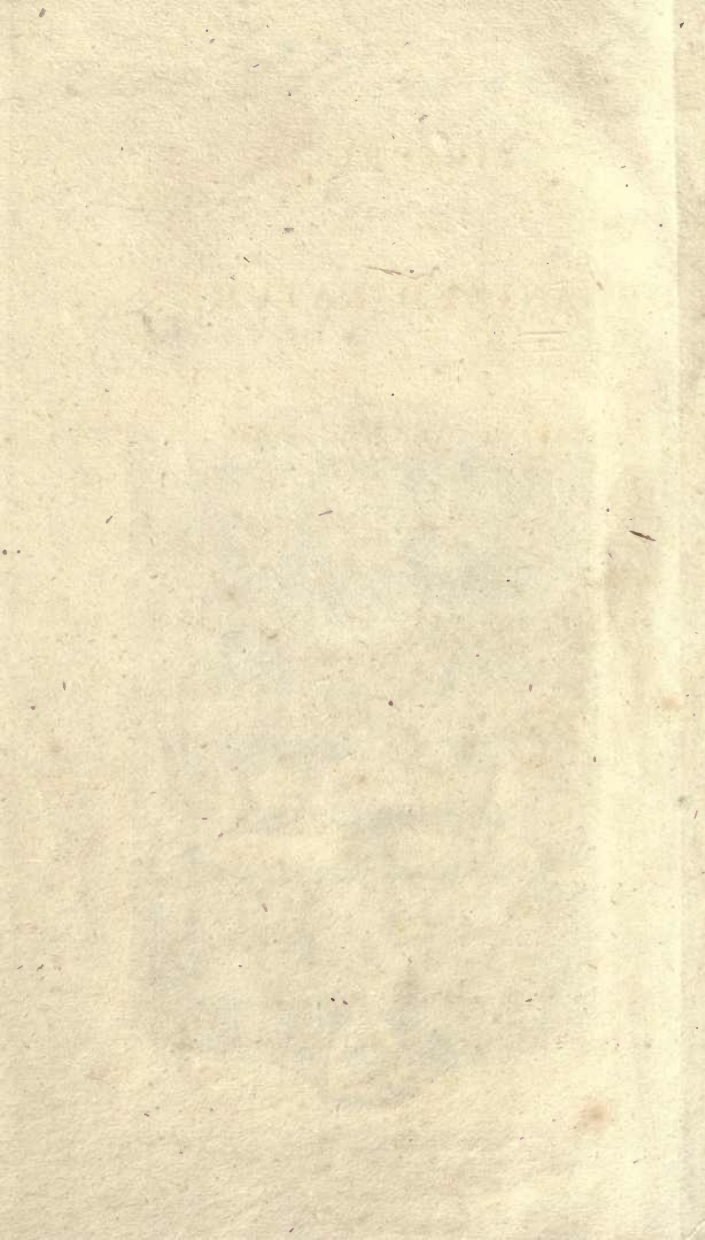
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W R Burgess.

Brook Farm

1830





PICTURE
OF
ORGANIZED NATURE,
IN ITS
SPREADING OVER THE EARTH.

TRANSLATED FROM THE GERMAN
OF
WILBRAND & RITGEN.

London :
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—
1828.

PICTURE

OF THE NATURE

OF THE HEAVENS OVER THE EARTH

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INTRODUCTION.

IN the present Picture of Nature, it is intended to afford, with as much accuracy as possible, an idea of the manner in which plants and animals are spread upon the earth. The solid portion of our planet is surrounded by two principal elements—water, and atmospheric air: by the former, to an ascertained depth: by the latter, to an unknown extent. Water forms the sea; out of which the earth rises: so that, as the surface of the earth does not extend to half that of the sea, it therefore appears to swim in it: of this the Picture, at the first view, affords a sufficient idea. On the main land, fresh water is found in rivers, lakes, and ponds: these run into the sea.

All plants and animals live in one of these elements, inhabiting either the water or the air; being, in the former, in a lower; and in the latter, in a higher degree of perfection. The world of animated nature begins, as a complete whole, in the water; whence it ascends to the atmosphere, to a more delightful participation of the sun's light; finally terminating in the perfect pattern of all organic formation—man.

The greatest luxuriance of organic life is un-

doubtedly in the plains of the Torrid Zone, at the level of the sea. From hence life fluctuates, according to the seasons, to a fixed limit, both in the Northern and the Southern Hemisphere, as well as in the depths of the Ocean;—similar to the action of the sun, whose quickening beams extend, with varied influence, to all places. Our Picture is therefore founded upon this state of organic life, as it spreads itself over the surface of the globe.

LINE OF PERPETUAL SNOW.

The limit to which, in every part of the globe, organized beings extend, in a perpendicular direction, above the level of the sea, is marked by a region where the cold is so intense, that the summits of mountains reaching or extending beyond that limit are covered with perpetual snow:—this is called the Snow-Line. The sea at both poles is covered with ice; in the Southern Hemisphere, in a larger; in the Northern, in a smaller proportion. The land, if any exist, is enveloped with eternal snow, vegetation ceases, animals die, and the inquisitive disposition of man terminates. There, of course, the snow-line is at the level of the sea; although water may flow under the ice as far as the poles. At a greater

distance from the poles, water appears between the icy tracts; the land is not covered with snow the whole year; minute vegetables cleave to the ground; and animals are found. At this point, the snow-line rises from the level of the sea towards the Equator, where it acquires its greatest perpendicular height.

The snow-line, according to Humboldt, begins under the Equator at a perpendicular height of 16,790 ft.; nor does it vary much from that point. In the 19th degree N.L., the limit is fixed at 15,026 ft.; in the 35th N.L. at 11,510 ft.; in the 43d N.L. at 8632 ft.; and reaches, in 62° N.L. (according to Wahlenberg), 5968 ft.; gradually decreasing to 75° N.L., where it is at the level of the sea.

Of the snow-line in the Southern Hemisphere but little is known. Forster, however, found ice on the sea in 60° S.L.; and the mountains in South Georgia, as well as in the Sandwich Isles, were covered with snow to the level of the sea. The same reckons the snow-line on Mount Egmont, in 39° S.L., to be 10,507 ft. We may therefore consider the region in 60°, in the Southern Hemisphere, as the point at which perpetual snow reaches the level of the sea.

The snow-line in the Picture is drawn according to these observations. Its height, however, undergoes

some change, in consequence of the different situations of countries in the same degree of latitude: hence it is, that countries in North America in the same latitude are much colder than those in Europe; and plants are found in Spitzbergen in 80° N. L. The altitude of the snow-line is therefore drawn at a mean; the deviations from which are marked with a star.

The snow-line, when considered as to its position to the Meridian, appears as a curve nearly resembling an ellipse; forming an eternal covering of snow; having its range, in every part of the globe, at a certain unchangeable height, beyond which organic life ceases.

But besides this perpetual line of snow, there is another, constantly varying according to the seasons. In the Northern Hemisphere, after the Autumnal Equinox, this line gradually becomes lower; being in the winter, according to circumstances, even in the middle of the Temperate Zone, at the level of the sea: on the contrary, in the Southern Hemisphere, as the sun reaches the Southern Tropic, the line rises, till it joins the perpetual snow; and as the sun returns towards the Northern Tropic, it again gradually descends towards the sea. Thus organic life fluctuates perpetually from North to South, and

ALTITUDE OF THE EARTH.

from South to North. It is this varying line of snow which intimates to birds of passage their time of migration.

This variable line of snow forms, in the direction of the Meridian, a similar curve to that which the earth describes when revolving round the sun; viz. an ellipse: being closely connected with the action of the earth which occasions the seasons.

ALTITUDE OF THE EARTH.

In the five parts of the globe, there are detached mountains as well as continuous ranges, which are elevated above the perpetual limit of snow. In our Picture, the chains of mountains and single mounts are delineated according to their true degree of latitude, together with their known heights. The lofty mountains of Asia occupy the back ground: immediately before them is the range of the Andes in America, running from North to South; and remarkable for having considerable altitudes in both Hemispheres. Before them appear the European and African mountains; the former being separated from the latter by the Mediterranean Sea, which is represented in the Picture as existing at the foot of Mount Etna. The African mountains are characterized by

the elevated sandy plains terminating, in the Southern Hemisphere, at the Cape of Good Hope; the summits of whose mountains are accurately designed according to their height. Lastly, the mountains of the Pacific Ocean, running from the Northern to the Southern Hemisphere, are represented by Mowna Roah, the Peak of Otaheite, and Mount Egmont.

1. Of the detached mountains, commencing at the North, the first is, *Parnassus* in Spitzbergen. Its height, according to Mulgrave, is 3956 ft., and is covered with perpetual snow to its foot.

2. The next is *Alkaware* in Lapland, in $67^{\circ} 25' \text{ N. L.}$ Its height, according to Wahlenberg, is 5062 ft., and considerably above the snow-line.

3. The lofty *Sulitelma* in Lapland, in $67^{\circ} 12' \text{ N. L.}$, whose height is 5798 ft., is covered with perpetual snow on its summit. The line of perpetual snow, according to Wahlenberg, is about 4369 ft. above the level of the sea.

4. The Volcano *Hecla* in Iceland, in 64° N. L. , gradually rises, by seven ridges, to a height of 4900 ft.; and, of course, much beyond the snow-line.

5. The *Åreskutan* in *Jemtland*, in $63^{\circ} 25' \text{ N. L.}$, (according to Wahlenberg, 5169 high,) reaches the districts of perpetual snow.

6. *Snæhatten* in Norway, in 62° N. L. , is, according

to Esmark, 8120 ft., topping the snow-line by 2152 ft.; which, according to Wahlenberg, lies at the height of 5968 ft.

7. Mount *St. Elias* on the north-west coast of North America, one of the loftiest summits of the Andes, situated at $60^{\circ} 21'$ N.L., rises far beyond the snow-line; being 17,038 ft. high.

8. The *Brocken* in Germany, in $51^{\circ} 12'$ N.L., compared with the preceding, appears quite minute; its height being only 3715 ft., and therefore far below the limit of perpetual snow.

9. *Schneekoppe* in Silesia, in $50^{\circ} 34'$ N.L., is 1598 ft. below the snow-line, the altitude of which is 6820 ft.; whereas, according to Gerstner, *Schneekoppe* is not more than 5105 ft.

10. The highest summit of the Carpathian Mountains, on the contrary, which lies in 49° N.L., and is called *Lomnitzer Spitze*, reaches the first part of the snow-line, in consequence of its height being 8632 ft.

11. *Grossglockner* in Salzburg, in 47° N.L., is 12,780 ft. high, and extends far beyond the snow-line.

12. *Mount Pilatus*, on the contrary, in the Canton of Lucerne, on account of its height being only 6993 ft., does not reach the snow-line: its summit is however frequently enveloped in fog.

13. The *Rigi*, in the same Canton, remains below the snow-line; its height being 5893 ft.

14. *Mount St. Gotthard*, on the contrary, in $46^{\circ} 40'$ N. L., extends far beyond the snow-line; its height being 12,021. In Switzerland, the limit of snow lies at an altitude of about 8300, and 8900 ft.

15. The *Jungfrau*, in $46^{\circ} 25'$ N. L., is likewise much elevated beyond the limit of the eternal snow. Its height, according to Tralles, is 13,718 ft.

16. The same holds good in *Oertler-Spitze* in Tyrol; whose height is, according to Gebhard, 15,364 ft.

17. The height of *Mont Blanc*, in $45^{\circ} 41'$ N. L., is, according to Saussure, 15,679 ft. The perpetual snow begins, according to the same naturalist, on the north side, in 8324 ft. altitude; and on the south side, in 8953 ft.

18. The *Great St. Bernard*, in $45^{\circ} 25'$ N. L., whose highest summit lies 11,062 ft. above the level of the sea, is covered on the summit with perpetual snow.

19. The *Puy de Dome* near Clermont, in $45^{\circ} 25'$ N. L., does not reach the snow-line. Its height, according to Delambre, is 4853 ft.

20. *Mont Mezin* in the Cevennes, (its height being, according to Adanzon, only 6567,) does not reach the snow-line.

21. *Mont d'Or* in Auvergne, in 45° N. L., is yet

lower; its height being, according to Delambre, 6196 ft.

22. The *Pic du Midi* of the Pyrenees, in $42^{\circ} 45'$ N.L., penetrates the snow-line; its height being, according to Ramond, 9640 ft.; and the line of perpetual snow commences on the Pyrenees at 11,180 ft.

23. The *Marboré*, also a Pyrenean mountain, in $42^{\circ} 25'$ N.L., extends yet farther into the snow-line; its height being, according to Ramond, 11,190 ft.

24. The same holds good in the *Maladetta*, another summit of the Pyrenees; which, according to Cordier, is 10,679 ft.

25. *Vesuvius*, in the vicinity of Naples, in 41° N.L., is, according to Saussure, 3899 ft.; and therefore remains much below the snow-line.

26. But the highest summit in Southern Europe, *Etna*, in $27^{\circ} 25'$ N.L., is covered with perpetual snow; its height being 10,963 ft.

27. Several summits of the *Cordilleras*, in North America, are higher than the limit of perpetual snow. Besides *Mount Elias*, there is the *Peak of Louisiana*, in about 36° ; which, according to Pike, is 19,803 ft.

28. The *Himalayan Mountains* in Asia, between the 40th and 30th degree of North Latitude, are undoubtedly the highest in the world. A peak in 35° of N. L., according to Crawford, is 24,964 high.

Measurements of a more recent date, by Captain Webb, and of which an account was given in the *Journal of Science* edited at the Royal Institution (Oct. 1818), point out much greater heights. From the boundary of Thibet, Captain Webb measured more than two hundred points of the Himalayan Chain ; the most remarkable of which are :

In 30° 46' 22" LAT.	24,342 ft.
30° 17' 59"	24,793
30° 21' 52"	27,357
30° 12' 15"	24,163
29° 59' 34"	24,221.

The limit of eternal snow in 30° 36' N.L. lies, according to Webb, at the height of 12,307 ft. Captain Hodgson, who, on the 31st of May 1817, discovered the Sources of the Ganges, is of opinion that the very spot where this river rises from under the snow is 13,754 ft. above the sea : which accords with Webb's account relative to the snow-line. Their height, moreover, coincides with that of the snow-line on the Peak of Teneriffe, on the Atlas Mountains in Africa, and Popocatepetl in Mexico.

29. *Lebanon* in Asia, in 30° N.L., whose height is 9535 ft., according to La Billadière, does not reach the snow-line, which lies at an altitude of 9708 ft.

30. The *Atlas Mountains* in Africa, in 32° N. L., penetrates the snow-line; their highest summit being 1378 ft.

31. The *Peak of Teneriffe*, in $28^{\circ} 17'$ N. L., does not quite reach the snow-line; its height being only 12,175 ft.

32. The *Pic d'Orizaba* in North America, in 20° N. L., penetrates the snow-line; its height being, according to Humboldt, 17,406 ft.

33. *Popocatepetl*, in $19^{\circ} 3'$ N. L. (being, according to Humboldt, 17,678 high), penetrates the snow-line, the height of which is 15,027 ft.

34. *Mowna Roah*, in Owhyhee in the Pacific Ocean, in 19° N. L., is divested of snow during the month of June: its height is, according to King, 15,432 ft.

35. *Cayambe* in South America, and under the Equator, nearly reaches the snow-line; its height being, according to Humboldt, 19,535 ft.

36. *Pichincha* in Quito, likewise under the Equator, approaches the snow-line: its height is 15,974 ft.

37. *Chimborazo* in Quito, in $1^{\circ} 27'$ S. L., is covered on its summit, to a great extent, with perpetual snow; its height being, according to Humboldt, 21,464 ft.

38. The Volcano *Cotopaxi*, to the south-east of Quito, penetrates to a great extent beyond the snow-line; its height being 18,870 ft.

39. The *Cordilleras* in South America, from Chimborazo to 8° s.L., elevate themselves from 9851 ft. to 11478. Beyond the 8th degree, several summits penetrate into the snow-line, varying in height between 19,000 and 14,000 ft. Many of them are active volcanoes. The *Corderillas* extend to the 25th degree s. l. Among numerous summits, *Descabezado* in Chili is particularly remarkable; its height being, according to Molina, 21,315 ft.

40. The *Peak of Otaheite* in the Pacific Ocean, in 18° s. L., does not reach the snow-line; its height being only 10,230 ft.

41. Finally, *Mount Egmont*, in the northern part of New Zealand, is represented in $39^{\circ} 25'$ s. l. Its height, according to Forster, is 15,315 ft.; and it penetrates considerably into the snow-line.

DEPTH OF THE SEA.

The depth of the sea is opposed to the elevation of the earth. In the air, a limit is placed to organic life by the perpetual snow-line, beyond which it cannot long exist. Whether in the sea, also, there be depths where no creature is able to live, or whether a boundary be assigned to organic life within those depths, cannot be ascertained. It however clearly appears,

from the observations made by Biot and other Naturalists, that fishes, according to their different dispositions, live in different depths of the Ocean. The parallel circles drawn in the sea correspond with the lines parallel to the snow-line: they, however, refer only in part to a well-known condition of life, and in part belong to a probable one.

GENERAL EXTENSION OF THE VEGETABLE KINGDOM.

I.

The vegetable world, according to distinctive characters which may be observed in plants, has been arranged under three grand heads; to each of which a name is assigned, from the peculiarities of seeds and buds.

Many plants, especially herbs, shrubs, and trees, bear seed, consisting of a single bud involved in two seed-lobes, *Cotyledones*; which, after germination, when the lobes appear above the earth, form two seed-leaves. Seeds of this kind are called *Dicotyledones*; a name which has been given to the plants themselves, whose seeds are of the above-mentioned description. Other plants bear seeds having a single bud with one seed-lobe: these are called *Monocotyledones*: and the name has likewise been given to the

plants themselves. Of this kind are the grasses and the palms.

Plants of the third kind either bear no seeds at all, but, in their stead, buds, as the mushrooms; or the seeds are quite simple, and comparable only to the buds in the seeds of *Dicotyledones*. These buds are considered as seeds without seed-leaves, and the plants which produce them are called *Acotyledones* (having no seed-leaves). Mushrooms, lichens, mosses, ferns, and marine plants, particularly wrak (*fucus*), and laver (*ulva*), are of that kind.

From a careful comparison of these three kinds of vegetables, it is unquestionably ascertained that the plants without seed-leaves are in the lowest state of vegetable existence: above them are the *Monocotyledones*: and, lastly, the most perfect are the *Dicotyledones*. We may therefore consider these three tribes of plants as presenting three degrees of perfection.

II.

It has been fully demonstrated by observation, that each of the foregoing tribes of plants is divisible into several distinct Orders, or natural assemblages; every Order containing a multitude of plants, which are distinguished, by their own peculiarities, from plants of other Orders. Thus the mushrooms, lichens,

mosses, ferns, &c., constitute peculiar Orders among the Acotyledones; the grasses, the grass-lilies, sword-lilies, the lilies generally, asparagus, palms, &c., among the Monocotyledones; the leguminous, podded, and umbellated plants, &c. among the Dicotyledones: each Order being subdivided into *Genera*, each Genus into *Species*, and each Species displayed in individual plants. Thus the whole vegetable kingdom may be compared to a tree, dividing itself into branches, twigs, and shoots.

III.

From remarks hitherto made, the most satisfactory conclusions are drawn, that certain Orders are found in the various portions of the globe, either exclusively, or in particular.

1. Although vegetation terminates on the line of perpetual snow in Acotyledones of diminutive size, they however appear in larger growth in temperate and warm climes, and partly assume the shape of more perfect plants, as is seen in the arboreous ferns.

2. Monocotyledones are found of most luxuriant growth and beauty, and in most frequent appearance, towards the Torrid Zone; impressing, at the level of the sea, at the Equator, their character to the vegetable world, in the palms.

3. Dicotyledones are more proportionably spread

over the surface of the earth : yet of these, herbaceous plants only occur towards the snow-line ; and arboreous ones rather grow in warmer countries.

IV.

In the Picture, the extension of the vegetable kingdom is represented on the northern or left side ; that of the animal kingdom, on the southern or right side. The classes and orders of plants, the genera of the mammalia, birds, amphibia, fishes, moluscæ, insects, crustaceæ, worms, and zoophytes, are marked by lines which refer to the limit of snow and the Torrid Zone, as far as the special orders approach in their extension, or, on the contrary, recede from them. Where, according to well-known observations, an order or genus peculiarly occurs, the name and the lines are engraved. These lines, when supposed to be moveable radii of a circle, will point out, by their motion, that district within which the organized beings either are found exclusively, or to which they particularly belong.

As the world of organized beings, within a certain district in the Equator, is distinguished by a proportional and luxurious abundance, the lines also are drawn up to a certain extent, lying around the very point of the Equator ; and which appears to be the

centre of organic vigour, from which the quickening rays extend to all parts of the organic world.

Few naturalists have as yet, when inquiring into the localities of plants and animals, taken into consideration the respective region of the earth to which each was particularly attached; and this was most neglected with regard to those plants and animals which, in the Torrid Zone from the level of the sea in ascendant direction to the snow-line, inhabit the different elevations. Humboldt and Bonpland have first shewn the way, by their admirable Picture of the Andes. Many observations ought therefore to be collated, in order to design, in our Picture, the spreading of various orders and genera; yet it could sometimes be pointed out only at a probable rate: it may therefore happen, that an order or genus is placed either farther from or nearer to the snow-line than they really are in nature. Such deviations, however, will not, we hope, be particularly detrimental to the use of the Picture.

EXTENSION OF THE ACOTYLEDONES.

1. All marine plants are Acotyledones; amongst which the wracks (*fuci*), and the lavers (*ulvæ*), are most abundant, and generally diffused. The former,

in some districts of the Ocean, occasionally cover the surface of the sea, producing an appearance similar to a green meadow; and are therefore called sea-grasses. Their extension cannot be accurately ascertained: it appears, however, from different observations made by naturalists, that, in the direction towards the poles, they extend beyond that region where the snow-line reaches the level of the sea, but that they grow principally in the seas of warmer climates: their extension is therefore designed as increasing towards the Equator.

2. During the summer, a green weed grows in fresh water, which gradually turns into slank clammy threads (*confervæ*), or extends to skinny substances or star-jellies (*tremellæ*). As such substances shew the continual growth of plants out of the fluid element, and as they occur in ponds and ditches in great quantities during the latter part of the autumn and the spring, their extension on the main land is designed from the snow-line to the Torrid Zone; but their native country is the vicinity of the limit of perpetual snow.

3. The structure of Mushrooms (*Fungi*) essentially coincides with that of the *confervæ* and *tremellæ*: they grow partly on the leaves and fruits of plants, as well as on putrescent animal substances; shewing,

in that way, a reviving vegetation, which is closely connected with the decay of vegetable and animal substances; and resembling, in that way, the green weeds which grow under water. The handsomer mushrooms shoot from the earth, similar to other plants; and are chiefly furnished with a cap, as the flowers are with bells or crowns. The mushrooms are more numerous in the Temperate than in the Torrid Zone: they chiefly vegetate in the latter part of summer and in the autumn, but dying away on the approach of frost. The line on the Picture has therefore been so drawn, that their native country is shewn to be much nearer to the line of snow than to the Torrid Zone.

4. The Lichens (*Lichenes*) are found in all parts near the snow-line, being the last signs of the vegetable world; extending between the snowy plains, beyond the limit of perpetual snow to the very extreme of cold. In Lapland they are found, according to Wahlenberg, at a height of 500 ft. They are numerous at the commencement of the snow-line, impressing, even there, their character upon vegetation. They, it is true, spread also to the Torrid Zone; but are at some distance from the snow-line, withdrawn by a happier vegetation; maintaining a preponderance over all other plants only near the snow-line.

According to such observations, their extension is represented on the Picture.

5. The Liverworts (*Hepaticæ*), as to their structure, are between the lichens and mosses; some of them, for instance the star-lip, having a closer affinity to the mosses; others, as the marsh-liverworts, to the lichens. They chiefly vegetate in the beginning of spring and the latter part of autumn. Their native country, therefore, lies between that of the lichens and the mosses.

6. The Mosses do not penetrate so far into the snow-line as the lichens. They are closer allied to the other plants with regard to their structure, but, according to general observations, very plentiful in those parts where flower-bearing plants seldom occur. In the Torrid Zone, they vegetate only in marshy damp spots, growing chiefly in the autumn and spring: accordingly, their native country is undoubtedly in the neighbourhood of the snow-line.

7. Between the mosses and ferns is the genus of Club-Moss (*Lycopodium*); resembling the mosses with regard to their growth, but vegetating like the ferns, particularly during the summer; bearing two valved capsules, in spikes; and, even in that view, approaching those ferns whose capsules are in the spikes; as, for instance, the genus of Flowering-Fern (*Osmunda L.*).

8. The native country of the *Ferns* lies in the beginning of the Torrid Zone. They are not however so exclusively found in that part of the world as the palms are, which, under the perpendicular rays of the sun, at the level of the sea, acquire the utmost luxuriance. Their native country lies, according to Humboldt and Bonpland, in a pendent line above that of the palms; where they are arboreous, resembling the palms in their exterior shape: whereas, in the Temperate and Frigid Zones, they are herbaceous, vegetating only in summer. According to Crantz, only four species of ferns are common to Greenland; and some species of them (*Pteris crispa* and *Pteris archangelica*) remain, according to Wahlenberg, 1400 ft. below the snow-line. Accordingly, the extension of these plants is so represented, that the Tropical Regions appear as their native country.

9. The order of Dutch Rushes (*Equisetaceæ*) is particular to the Frigid and Temperate Zones, although their native country cannot be accurately ascertained. In consequence of their being cryptogamic plants, they obtain a very low degree of perfection: shewing however, in their membranous structure, and in the spikes (wherein they bear the buds of fructification), a degree of perfection that becomes real in the grasses. According to these circumstances, the native country

of the grasses may be considered as that of these plants. According to Cranz, *Equisetum arvense* is the only one met with in Greenland.

10. The Palm Ferns in the Torrid Zone, of which only two species, *Zamia* and *Cycas*, are as yet known, bear a resemblance to the Equisetaceæ in the Temperate Zones, in the rudiments of their blossom. Their native country is that of the arboreous ferns.

11. Of plants without seed-leaves, the Naiades come nearest to the Monocotyledones. The genera of the Duck-Meat (*Lemna*), the Horn-Wort (*Ceratophyllum*), the Milfoil (*Myriophyllum*), and the *Chara*, are common inhabitants of fresh water in the Temperate Zone. Of the Acotyledones, these only bear some, but very few, rudiments of flowers. According to their character, as being water-plants, and what observation of their extension furnishes, the Temperate Zone must be regarded as their native country.

OF THE MONOCOTYLEDONES.

1. Of all Monocotyledones, and even of all flowering plants, the grasses extend nearest to the snow-line. Grassy plains are found, however, in the Torrid, Temperate, and Frigid Zones, on this side of the region in which lichens prevail. Commencing in that region where they characterize the vegetable world, they extend themselves in one way to the greatest

heat ; and, in the opposite, to the vicinity of the snow : losing their character, however, towards the Torrid Zone, in handsomer and more luxuriant plants. In the Torrid Zone, the appearance of some grasses, for instance the bamboo, approaches that of the palms, both in their beauty and size ; and the time of their growth and blossoming accords with that local situation. According to these observations, the line of the grasses has been drawn from the snow-line to the Torrid Zone, and the prevalence of the grasses on this side of the limit pointed out.

2. In the same way as the Monocotyledones terminate at the snow-line in grasses, they become conspicuous in the Torrid Zone by the luxuriant magnificence of the palms and plantain-trees. The palms and plantains, from their structure, belong peculiarly to the scorching sun-beams of the Torrid Zone ; and scarcely extend to neighbouring parts in the Temperate Zones, either in perpendicular or horizontal direction. The wax-palm is found on Chimborazo, as high as 2800 ft. ; and the dwarf-palm (*Chamærops humilis*) in the southern part of Europe, growing only in the neighbourhood of the sea-coast. The line indicating the locality of this order of plants has therefore been drawn from the Torrid Zone to the middle of the inhabitable part of the globe.

3. The Plantain-trees (for instance, the Figs of Paradise, *Musæ*), are, as to their luxuriant growth, size of leaves, and colour, superior to the palms, but much more confined to the Torrid Zone.

4. The Order of the Reed (*Cannæ*), as well as that of the Ananas (*Bromeliæ*), are likewise peculiar to the Torrid and Warm Zones: this chiefly holds good in the spicy plants, Ginger (*Amomum*), Costus, and Curcuma. From observations hitherto made, their extent, from the Torrid to the Temperate Zones, cannot be ascertained. The Flowering Reed (*Canna indica* L.), in the middle part of Germany, also prospers, in the summer, in the open air.

5. The other Orders of the Monocotyledones are less limited with regard to their extension. The most beautiful, however, and particularly those which are conspicuous for their magnificent flowers or spicy properties, inhabit the warmer countries: they attain their greatest number, and highest degree of perfection, in the Tropical regions. Several Monocotyledones are diffused to a very great extent; and particularly the Bee-Flowers (*Orchideæ*), which commence in the neighbourhood of the snow-line: for instance, according to Wahlenberg, the *Ophrys alpina* occurs in Lapland at 800 ft. below the snow-line. In the Torrid Zone their frequency and beauty increase;

shooting, like the Mosses and Lichens of our climate, from the stems of trees, and ornamenting them with their lively green and magnificent flowers; “ sometimes resembling winged insects; at others, delicate birds, as though attracted by the fragrance of the honey-vessels: indeed, their beauty is so great, that the life of a painter would be insufficient to depict all the varieties of magnificent Orchideæ which adorn the valleys of the Peruvian Andes.” (HUMBOLDT.) Several of these flowers, less beautiful in the Temperate Zone, adorn our meadows. The Vanilla, which grows as a parasitical plant in the Tropical Zone, is of this kind. It is curious that the Orchideæ, like the Lichens, keep on the ground in the Cold and Temperate Zones, but grow out of the stems of trees, as parasitical plants, in the Torrid Zone. The Lichens, however, occur more frequently as parasitical plants, as soon as shrubs and trees are met with in the vegetable world, beginning in the snow-line. In our Picture, the line corresponding with these plants is marked as gradually decreasing from the Torrid Zone to the 5th degree on this side of the limit of perpetual snow.

6. The Order of *Asphodeli* is almost as far diffused as the Orchideæ. In the Grassy tracts, they bear some resemblance to the Grasses; as, the Spider-Wort

(*Anthericum ossifragum*, *A. calycinum*), the Garlic (*Allium schænoprasum*), &c. Their frequency, beauty and variety increase towards the Tropical regions; and they themselves become shrubby and arboreous in the Aloe, passing in that character to the Torrid Zone.

7. Of a less extension is the Order of Asparagus plants. These increase towards the warmer climates, in size, frequency, and beauty; and assume in the Torrid Zone the character of Palms, in the Dragon-tree.

8. The *Aroideæ* begin in the cold climates (as in Lapland), with the species *Zostera* and *Calla*; gradually passing over to the Torrid Zone, where the Genera *Dracontium*, *Pothos*, &c. are natives, and, like the *Orchideæ* of the Tropical regions, ornamenting the stems of trees, as parasitical plants. The fresh green of the *Pothos*-leaves corresponds with the coloured flowers of the *Orchideæ*. The Sweet-smelling Rush (*Acorus calamus* L.), the Wake-Robin (*Arum maculatum*), and the Ethiopian Arum (*Calla palustris*), inhabit the middle of the Temperate Zone.

9. The Lilies, and Liliaceous plants, are common to the Torrid, and to the warmer half of the Temperate Zone, where they in part prove arboreous; as

in the species of the *Yucca* Genus. They are remarkable for their beautiful growth, lively green, and large magnificent, bell-shaped flowers. Of this kind are the Lilies (*Lilia*), and the Fritillaries (*Fritillaria*), of which the Crown Imperial (*F. imperialis*) ornaments our gardens; and the Genus of superb Lilies (*Gloriosa*), Tulips (*Tulipa*), &c. Of those which grow in a wild state, beyond the middle of the Temperate Zone, are, the Wood-Tulip (*T. sylvestris*), the Wood-Martagon (*Lilium martagon*), and the *Fritillaria meleagris*. The region which lies in the 54th degree of Northern Latitude may be regarded as the extreme point to which Liliaceous plants extend.

10. The Order of Daffodils (*Narcissi*) spreads from the Torrid Zone, over great part of the Temperate, without entering into the Frigid. The Snow-drop (*Galanthus nivalis*), and the greater Snow-drop (*Leucojum vernum*), grow nearest to the Alpine tracts. The Asphodel Lily (*Crinum*), the African-blue Lily (*Agapanthus*), the Mountain-Saffron (*Bulbocodium*), the Sea-Daffodil (*Pancratium*), and the Lily-Daffodil (*Amaryllis*), are natives of warmer countries. Several kinds of Daffodils are common to the colder part of the Temperate Zone. Their correspondent line on the Picture is drawn as far as the 60th degree of North Latitude.

11. Of the Order of Flower-de-Luce (*Irides*), the common one (*Iris pseudacorus*) is a native of Lapland ; and some species of the Saffron Genus (*Crocus*) are inhabitants of lofty mountains. The Corn-Flag (*Gladiolus communis*) occurs in the middle of the Temperate Zone. But most species, and the handsomest of the kind, become common in those regions which lie in the 30th degree of latitude, passing from hence into the Warm Zone. This is the case especially, with the Genus *Ixia*, *Moræa*, *Antholyza*, *Wachendorfia*, *Dilatris*.

12. The *Hydrocharides* are natives of the Temperate Zone. But the Water-Lilies (*Nymphæa alba* and *lutea*), which are of this Order, occur also in Lapland.

13. The Rushes (*Junci*) first display themselves in flowers without colour, and in the shape of Grasses, in the neighbourhood of the snow-line. They bear coloured flowers in the Water-Plantain (*Alisma*), and the Flowering-Rush (*Butomus*): in which manner they pass into the Torrid Zone, of which place the greater number and finer sorts are natives; for instance, the Commelinas.

14. The Order of the *Cyperoideæ* is closely related to the Grasses. They all bear a strong resemblance, in their growth and flowers, to the Grasses; among

which they are found in great abundance, in marshy places. Their native country closes with that of the Grasses: the most beautiful species, however, (for instance, the *Cyperus*,) are peculiar to warm countries.

OF THE DICOTYLEDONES.

The Dicotyledones consist of herbs, shrubs, undershrubs, and trees. In the vicinity of the snow-line, nothing but herbaceous plants are found; to which succeed shrubs and dwarf trees. Their number and size increase in the Temperate Zone. In the warmer climates they form impenetrable forests. "Trees," says Humboldt, "twice the size of our Oaks, are adorned with blossoms as large and magnificent as the Lilies of the Temperate Zone."

It was impossible, in the construction of the Picture, to represent all the Orders of Dicotyledones: those only have been selected which are able to throw some light on their extension.

1. Of all Dicotyledones, Species of the Saxifrage (*Saxifrageæ*) occur more frequently, and in greater number on the snow-line: for instance, in Lapland, according to Wahlenberg, *Saxifraga stellaris*, *rivularis*, and *oppositifolia*. In Tyrol, from observation made by Count Sternberg, *Saxifraga burseriana*, and *bryoïdes*. In Switzerland, *Saxifraga aspera* and

bryoides. Thence they extend, as herbaceous plants, towards the Temperate Zone, without being peculiar to the Warmer one. Some shrubs and trees, however, in warmer countries, especially the *Hydrangea* and *Weinmannia*, point out some affinity to the *Saxifrages*.

2. The Order of *Caryophyllæ* is, in general, peculiar to the Cold and Temperate Zones. The exterior structure of these plants resembles that of the grasses. The stalk bears knots, like that of grasses; out of which leaves, opposite in pairs, put forth, which are confluent round the stalk. *Silene acaulis*, *Cerastium alpinum*, *Lychnis alpina*, *Arenaria ciliata*, *Alsine rubella* and *biflora*, grow partly in the snow-line, and partly in its vicinity: they spread over greater part of the Temperate Zone, and are chiefly herbaceous plants.

3. The Order of *Gentian* (*Gentianeæ*) belongs likewise to the Cold and Temperate Zones, and commences at the snow-line, with the *G. glacialis*, *G. nivalis*, *G. tenella*. It gradually increases in regard to number and size, passing from the cold to warmer climates.

4. The Order of *Ranunculaceæ* consists, in a great degree, of herbaceous plants, inhabiting principally the countries of the Cold and Temperate Zone; be-

ginning near the snow-line in Lapland, with *Ranunculus glacialis* and *nivalis*, and attaining its greatest degree of perfection in the Temperate Zone.

5. The same holds good in the Order *Pediculares*, some plants of which, occur even in the snowy plains; namely, *Pedicularis hirsuta* and *flammea*, in Lapland; *Pedicularis lapponica* and *Veronica alpina*, in Greenland; *Bartsia alpina*, on the Alps.

6. The Order of *Lysimachiæ* consists chiefly of herbaceous plants, belonging to the cold and Temperate Zones. Several of this species grow on the snowy plains, others in the vicinity; as, *Androsace chamæjasma* and *carnea*, *Aretia alpina*, *Soldanella alpina*, *Primula viscosa* and *farinosa*, with many others.

7. The Lipped-flowers (*Labiatae*) spread to a great extent, beginning at the snow-line or its vicinity, in Alpine herbs; viz. *Ajuga alpina*, *Scutellaria alpina*, &c. passing from thence from the Temperate to the Torrid Zone, and increasing with regard to their number, growth, and beauty of flowers. There are, already, in one half of the Temperate Zone, some shrubs of that Order; for instance, the Rosemary in Spain, and several kinds of sage. This Order is, in general, more natural to the Temperate, than to the Torrid Zone.

8. The Podded-plants (*Cruciferæ*) include, in their Order, all plants with four cross-shaped-petals, and podded fruits: it begins in some herbs at the snow-line; namely, *Arabis alpina* and *cærulea*, *Cardamine alpina*, *Draba hirta*, *Cochlearia groenlandica*; and extends over the cold and greater part of the Temperate Zone, without reaching that of the Torrid; and probably reaches its utmost perfection in the region between the 50th and 60th of Northern Latitude.

9. The numerous Order of Leguminous plants (*Leguminosæ*) begins near the snow-line, in some mountain herbs, namely, *Astragalus leontinus*, *alpinus* and *montanus*, *Phaca alpina*, &c.; gradually increases in size and beautiful growth, number of individuals, species, and genera; and proceeds from the form of herbs into that of shrubs, and finally into trees. It spreads, with a continually increasing abundance, over the Temperate and Warm Zones; becoming remarkable in the latter, from many tall trees with winged leaves and beautiful blossoms. Several of the Sensitive plants of this kind are particularly deserving of attention, from the irritability of their leaves. Next to them, as chiefly remarkable, are the Brosilettos, Locust-tree, Mountain Ebony, Three-horned Acacia, and Tamarinds. The greater part of the alimentary herbs in the Temperate

Zone are of this species; as the different species of Clover, Vetches, Peas, and Beans. Of the shrubs and trees, are the Bladder-Senna (*Colutea*), Trefoil-tree (*Cytisus laburnum*), and the False-Acacia (*Robinia pseudoacacia*).

10. Plants with compound anthera (*Syngenistes Compositæ*) spread over the whole earth; commencing in the vicinity of snow, with dwarfish plants of herbaceous quality; viz. the Sow-thistle (*Sonchus alpinus*), Mountain Hawkweed (*Hieracium alpinum*), Mountain Sawwort (*Serratula alpina*), Mountain-Cudweed (*Gnaphalium alpinum*), Groundsel (*Eri-geron uniflorum* and *alpinum*), Coltsfoot (*Tussilago frigida*), some species of Milfoil (*Achillea nana* and *atrata*), Mountain Wormwood (*Artemisia glacialis*), and the Dandelion (*Leontodon nivale*). These attain their greatest perfection in the Temperate Zone; the plants being for the most part herbaceous, with a few shrubs.

11. The Umbellated plants (*Umbelliferæ*), which are related to the Syngenesia, commence at some distance from the snow-line, in herbaceous plants; from thence spreading over the Temperate Zone to the warmer climates, and increasing, in that direction, in number, size, and beauty; although the Temperate Zone must be considered as their native country.

Some are remarkable for affording volatile oil ; others, for their poisonous qualities : for instance, the Fennel, Cummin, Fennel-flower, Hemlock, Water-hemlock, and, in warmer countries, the Assafoetida (*Ferula assafoetida*). Some are cultivated in gardens, for their root ; as, the Parsnip, Carrot, and Water-Parsnip (*Sium sisarum*). This Order does not appear to extend beyond the region in the 30th degree.

12. The Fig-Worts (*Scrophulariæ*) are herbaceous at some distance from the snow-line ; remain in the same state in the Temperate Zone ; and become shrubby in the Torrid. The plants, *Antirrhinum*, of which the *A. alpinum* inhabits the Alps, the *Scrophularia*, and the *Digitalis*, belong to this Order.

13. The Dwarf-rose-bays (*Rhododendra*) begin in herbaceous shrubs between the Alpine plants. *Azalea procumbens* and *lapponica*, according to Wahlenberg, occur in some quantity in Lapland, at the height of 800 feet below the snow-line. They are rather the natives of colder than of warmer climates. The most beautiful species, however, are peculiar to warm countries only.

14. The Order of Rose-like plants (*Rosaceæ*) consists of a great number of herbs, shrubs, and trees, and admits of several subdivisions. At some distance from the snow line it commences with some few

herbs ; as, the *Dryas octopetala*, Cinquefoil (*Potentilla nivea*), and the common Strawberry (*Fragaria vesca*). To these succeed, according to Wahlenberg, at 3200 feet below the snow-line, some small shrubs : for instance, in Lapland, the Raspberry (*Rubus chamaemorus*), and the *Rubus arcticus*. Afterwards, larger species of shrubs, and small and large trees, are found. In the Temperate Zone, besides many herbs and shrubs, all stone-fruits belong to this class.

15. Most of the Amentaceous plants (*Amentaceæ*) consist of shrubs and trees : yet this Order begins in the neighbourhood of the snow-line, in plants that are partly herbaceous (*Salix polaris* and *herbacea*) ; continuing from thence as far as the Tropics, in a multifarious variety of under-shrubs and dwarf trees ; and finally in the Torrid Zone, ending in trees. *Salix lanata* and *myrsinites*, as well as the dwarf Birch-tree (*Betula nana*), occur in Lapland, as far as 800 feet below the level of the snow-line, according to WAHLENBERG. This Order contains most of the shrubs and trees of the Cold and Warm Zones ; as, the Willows, Poplars, Birch, Hazel, Beech, Elms, Oaks, and Alders. As the frondiferous forests of the Temperate Zone chiefly consist of plants of this Order, the region from the 60th to the 40th degree N.L. may be regarded as their native country. They

all blossom in the spring; and some of them, for instance the Hazle, Alder, Willow, and Birch-trees, very early. Among these, the Willow is most diffused; beginning at the snow-line, to the level plains of the Equatorial region.

16. The Order of Coniferous plants (*Coniferæ*) is closely allied to the Amentaceæ. It begins at the same distance from the snow-line; partly in the common Juniper (*Juniperus communis*); partly on mountains, in the Dwarf-Pine (*Pinus pumilio*), which is only a species of the common Fir, gradually becoming tall trees and forming large forests. In the warm countries, instead of these, the Casuarines (*Casuarina*) occur. The region which coincides with the 50th degree N.L. may be regarded as the native country of this Order.

17. The Order of the *Caprifolia* commences at some distance from the snow-line, in herbaceous and shrubby individuals (*Cornus suecica*, *Linnea borealis*) soon turning into shrubs and trees; extending through the Temperate to the Torrid Zone, where they, chiefly with the *Rizophora Mangle*, form large groups of trees. In the Temperate Zone, the following Genera of this Order occur: the Honeysuckle (*Lonicera*), Elder-tree (*Sambucus*), pliant Mealy-tree (*Viburnum*), and Dog-Wood or Cherry (*Cornus*). The

region between the 60th and 40th degree of Latitude is most abundant in plants of this Order.

18. The Order of Borage (*Boragineæ*) extends from the limit of snow to the Torrid Zone. It appears first in the neighbourhood of the Alpine snows, in single herbaceous plants; as in the Perennial Mouse-ear (*Myosotis perennis*); and continues, for the most part, in the same state in the Temperate Zone, especially the Genera of the Mouse-ear (*Myosotis*), Hound's-tongue (*Cynoglossum*), Bugloss (*Anchusa*), Lungwort (*Pulmonaria*), Wryneck (*Lycopsis*), Borage (*Borago*), small Wild Bugloss (*Asperugo*), Comfrey (*Symphytum*), Viper's Bugloss (*Echium*), Gromwell (*Lithospermum*), and Turnsole (*Heliotropium*.) In the warm countries, shrubby and arborescent plants are related to this Order. The middle of the Temperate Zones may be considered as their native country.

19. The Order of the *Onagræ* begins in the neighbourhood of the snow-line, with herbaceous plants; and continues, for the most part, in that quality in the Temperate Zone; but in the warm countries it contains several shrubs and trees. On the Alps are found of this Order, the Mountain-Enchanter's Nightshade (*Circæa alpina*), and the Mountain-Willow-herb (*Epilobium alpinum*); in the Temperate Zone, the

species of Willow-herb (*Epilobium*), the Primrose-tree (*Oenothera*), the Enchanter's Nightshade (*Circæa*): and in warm countries, the Sanders (*Santalum*), &c. The native country of this Order is in the region of the 40th degree N. L.

20. The Order of the Heaths (*Ericæ*) displays itself, in the vicinity of the snow-line, in some herbaceous plants; as, *Andromeda tetragona* and *hypnoides*, and *Empetrum nigrum*. Large districts of the old world are covered with the Common Heath (*Erica vulgaris*): it increases towards the warmer countries, in variety, size, and beauty. Humboldt found the most luxuriant Heaths in the African Islands, on the declivity of the Peak of Teyde. In the Southern Hemisphere, many Heaths grow in the neighbourhood of the Cape of Good Hope.

21. The Order of *Gerania* begins at some distance from the snow-line; namely, *Geranium sylvaticum*, in Lapland; reaching a higher degree of perfection in warm countries, and finally displaying itself in the Pelargoniums, which are herbaceous and shrubby in warmer parts of the Temperate Zone, and occur in vast numbers. The extension of these plants coincides with that of the Heaths.

22. The Order of Madder (*Rubiaceæ*) appears some degrees on this side of the snow-line, in several herbs

with star-shaped flowers ; as the Ladies' Bed-straw (*Galium boreale*), the Wood-roff (*Asperula*), &c. In the greater part of the Temperate Zone they are herbaceous ; but in the warmer part grow into shrubs and trees, which last pass over into the Torrid Zone. Of such are the China-trees, on the left declivity of the Andes ; and in the warmer countries, the Coffee-tree, and other plants.

23. The Order of the Mallows (*Malvaceæ*) is in its greatest luxuriance and number in the Torrid Zone, where large trees grow with short stems of great circumference and magnificent flowers. The Monkeys-Bread tree (*Adansonia digitata*) has a stem of 12 feet high and 30 in diameter. The Order of Mallows spread, in shrubby and herbaceous plants, from the Torrid through the warmer part of the Temperate Zone ; ending finally in herbaceous plants, as the *Sida pichinchensis*, in the Andes ; and in the middle of Europe several herbaceous Mallows and Lavateras.

24. The Order of the Nightshade (*Solaneæ*) is particularly common in the Torrid and Temperate Zones, containing in warmer climates several shrubs ; in the Temperate, only a few under-shrubs, but for the most part herbs, many of which are poisonous ; as, the Henbane (*Hyoscyamus*), the Thorn apple (*Da-*

tura), the Deadly Nightshade (*Atropa*), the Tobacco (*Nicotiana*), the poisonous Nightshade (*Solanum nigrum*); together with some kinds which bear bulbs on the roots, as the Potatoe (*Solanum tuberosum*).

25. The Bindweed (*Convolvuli*) commences in the vicinity of the snow-line, in the herbaceous form; as in the *Diapensia lapponica*, which occurs in Lapland 100 feet below the snow-line; continues herbaceous in the Temperate countries; and finally ends in the warm climates in shrubs, although some herbs are still found.

26. The Order of the *Urticæ* begins at some distance from the line of perpetual snow; viz. on the plains of Lapland, with the common Nettles (*Urtica urens* and *dioica*); and becomes shrubby and arborescent in the Temperate Zone, passing into the Torrid Zone in that quality. Of this kind are, the Mulberry-tree (*Morus*), the Fig-tree (*Ficus*), and, in the Torrid Zone, the Trumpet-tree (*Cecropia*), and the Bread-Fruit-tree (*Artocarpus*), &c.

27. The Order of the Gourds (*Cucurbitaceæ*) begins, in the herbaceous shape, in the species of the Bryonies (*Bryonia*), in the region which lies in the 58th degree of N.L. It spreads from the Temperate, with increasing perfection, into the Torrid Zone; and contains in the Passion-Flowers (*Passiflora*), on the

boundary of the Warm Zone, several herbaceous and arboreous plants; to which are joined several trees in the Torrid Zone.

28. Of a similar extension are the plants with Whirled Flowers (*Apocynæ*); as, the Periwinkle (*Vinca*), and the Swallow Wort (*Asclepias*).

29. The Order of (*Papaveraceæ*) spreads over the Temperate Zone. It commences, in the region which lies in the 86th degree N. L., with the small herbs of the Fumitory-plants (*Fumaria*), gradually becoming handsomer and herbaceous, as the Celadine (*Chelidonium*) and Poppy (*Papaver*); finally becoming shrubby in the *Bocconia*.

30. The Order of the *Guajacanæ* is a native of the Torrid Zone, but passes over into the contiguous parts of the Temperate Zone, nearly as far as the 42d degree N. L. The Genus of Storax (*Styrax*) belongs to the latter.

31. The Order of *Jasmineæ* consists of shrubs and trees, which are dispersed over the Temperate towards the Warm Zone. Individuals of this class are, the Privet (*Ligustrum*), the Lilac (*Syringa*), the Ash (*Fraxinus*), and the common Jasmin (*Jasminum*); of which the Privet penetrates furthest into the colder half of the Temperate Zone.

32. The *Cacti* are almost exclusively natives of the

Warm Zone ; nor do they spread further than the contiguous parts of the Temperate.

33. The Order of the Bay-trees (*Lauri*) spreads from the Torrid to the middle of the Temperate Zone, where it ends in the Bay-tree. In the Torrid Zone the Nutmeg-tree is of this Order.

34. The *Myrti* are diffused over the Torrid Zone, and the greater part of the Temperate. Of this Order, the Mock Orange (*Philadelphus*) is found in the Temperate Zone, as far as the 55th degree N. L. This Order in the Torrid Zone consists of many general Species and individuals; among which is the Clove-tree.

35. The Order of the Soap-Berries (*Sapindi*) consists, for the most part, of shrubs and trees, which are natives of the Torrid Zone ; whence they spread to the contiguous part of the Temperate.

36. The American-Gooseberries (*Melastomæ*) are likewise natives of the Tropical regions, and for the most part arboreous.

37. The Order of Bead-trees (*Meliæ*) contains many kinds of arboreous and shrubby plants ; which, for the most part, are natives of Warm and Torrid climates.

38. The *Guttiferæ* are natives of the Torrid Zone.

39. The *Aurantia* are either shrubby or arboreous ;

spreading from the Warm to the contiguous parts of the Temperate Zone, and ending in about the 45th degree of Latitude. The Citron-tree (*Citrus*), Lemon-tree (*Limonia*), and the Tea-tree (*Thea*), are of this Order.

40. The Order of the Fig-Marygolds (*Ficoideæ*) is diffused over the Torrid, and warmer parts of the Temperate Zone, nearly as far as 45° Latitude. It contains a great number of succulent plants of herbaceous and shrubby quality; of which several species of the Fig-Marygold (*Mesembryanthemum*) are met with in the green-houses of the Temperate climate.

OF ORDERS NOT DESCRIBED IN THE PICTURE.

1. That of the Birthwort (*Aristolochiæ*), a native of the Torrid Zone. In the colder half of the Temperate Zone, this Order has but few herbaceous specimens; as the Asarabacca (*Asarum*), and the *Aristolochia clematitis*.

2. The Order of the Wild-Olives (*Elæagni*) begins in the district of the Alps, in a few herbs; namely, the Bastard toadflax (*Thesium alpinum*), gradually becoming shrubs and small trees; and in the forest of the Torrid Zone, trees of a large size. In the Temperate Zone, the Sea-Buckthorn (*Hippophaë*), and the Oleaster (*Elæagnus*), are of this class.

3. The Order of Knot-Grasses (*Polygoneæ*) comprehends herbs of various size, which commence with the snow-line, as the *Rumex digynus* in Lapland: they, for the most part, inhabit the Temperate Zone; yet become remarkable in warm countries for their growth and medicinal qualities, and in part becoming shrubby. Of that kind are the Genera of the Dock (*Rumex*), the Rhubarb (*Rheum*), the Knot-Grass (*Polygonum*). These plants resemble, in some properties, the Monocotyledones, from their leaves shooting out of the sheaths, and the flowers of many of them unfolding themselves in proportion to the number Three. The Buck-wheat (*Polygonum fagopyrum*) is made use of for corn.

4. The Order of Oraches (*Atriplices*) consists, for the greater part, of herbs and a few shrubs; chiefly inhabiting the Temperate Zone, but extending also to the Torrid. The Glasswort (*Salsola* and *Salicornia*) belong to the latter, inhabiting the coasts and salt-marshes: some of them are used as pot-herbs; as, the Spinage (*Spinacia*), the Beet (*Beta*), the Orache (*Atriplex*), the Blite (*Blitum*), and a kind of Goose-foot (*Chenopodium*).

5. The *Amaranthi* are herbaceous plants, and flourish in Temperate climates; nor are they numerous. Of this Genus, are the Rupture-wort (*Herniaria*),

the Mountain-knot-grass (*Illecebrum*), the *Amaranthus*, and the Coxcomb (*Celosia*).

6. Most plants of the Order *Vitices* inhabit warm countries: It consists, for the most part, of shrubs, and but few herbs; of which the Vervain (*Verbena officinalis*), in the Temperate Zone, extends nearest to the cold countries.

7. The plants of the Order *Bignoniæ*, in the Warm Zone, and the warmer half of the Temperate, consist of shrubs, under-shrubs, and trees; the latter of which are peculiar to the warm countries.

8. The Order of the *Sapotæ* contains shrubs, under-shrubs, and trees; which chiefly grow in warm climates.

9. The Order of the Bell-flowers (*Campanulaceæ*), to which the Horned-Rampions (*Phyteuma*), the Sheep's-Scabrous (*Jasione*), and the Cardinal-flower (*Lobelia*) are to be reckoned, begins in the vicinity of the snow-line, as the *Companula uniflora* in Lapland, and extends over the Temperate Zone. The handsomer species are met with only in warmer countries. It consists only of herbs and a few shrubs.

10. The Order of the Scabiouses (*Dipsaceæ*) spreads, as herbaceous plants, over the Temperate and Warm Zones.

11. The Order of the Caper-bushes (*Capparides*),

in the Warm and the contiguous part of the Temperate Zone, consists of trees, shrubs, and herbs.

12. The Order of Barberry-plants (*Berberides*) begins, in the form of herbs, in the colder tracts of the Temperate Zone (*Epimedium alpinum*); proceeding afterwards into shrubs which inhabit the Temperate Zones.

13. The Order of the *Rutaceæ* is herbaceous and shrubby, and grows from the middle of the Temperate towards the Warm Zone. Of this kind are the Rue (*Ruta*), and the Dictany (*Dictamnus*).

14. The Order of the *Portulacææ* consists of herbs and shrubs; which, beginning in the colder portion of the Temperate Zone, extend towards the Torrid.

15. The Order of the Water-Willows (*Salicariæ*) is closely related to that of the rose-flowered plants; and consists of herbs and shrubs, which are peculiar to the Temperate and Warm Zones. It begins, in some herbs, in the colder parts of the globe; as, *Glaux maritima*, *Peplis portula*, *Lythrum salicaria*.

16. The Order of the *Terebintacææ* is nearly allied to that of the leguminous plants. Its fruits have stones; and the pair of shells, wherein the stone lies, resembles the pair of valves in the leguminous plants: the relation to which appears, moreover, from their consisting of many plants and trees; which are, espe-

cially with regard to the handsomer species, peculiar to the Torrid Zone. They extend over the greater part of the Temperate Zone.

17. The Order of the *Rhamni* consists of shrubs and trees, which extend from the warmer climates over a large portion of the Temperate Zone; particularly in the species of the Buckthorn (*Rhamnus*), and some species of the Spindle-tree (*Euonymus*), Bladder-Nut (*Staphylea*), and Holly (*Ilex*).

18. The Order of the *Euphorbiæ* is particularly common to warm countries in several trees and shrubs; from whence it extends, in the form of herbs, over the greater part of the Temperate Zone. Besides the Euphorbium, there are the Box-tree (*Buxus*), and the Castor-oil Plant (*Ricinus*).

OF THE SPREADING OF ANIMALS.

Every Plant adheres to the ground, where it grows either immediately, or, as a parasitical one, mediately: and every class of plants is peculiar to a certain soil, as well as to a certain climate. The Animals, on the contrary, are not bound to the globe; they arbitrarily change the country they inhabit the more they approach man with regard to gradual perfection. Man, only, extends himself over the whole of the

Zones: he boldly passes beyond the limit of eternal snow, prying into the structure of Nature in regions which are elevated above the common limits of terrestrial life; and boldly, and at his pleasure, descends into the earth, creating in its eternal darkness a new life. Next to him, in rank, in partaking of life, are the Mammalia, Birds, Amphibia, Fishes, Molluscæ, Insects, Worms, Zoophytes; and even the minute Animalcules, which, during the summer, grow in every water to an infinite number, and are called animals of infusion. Still, a certain portion of our globe is appointed to each class, genus, and particularly to each species of animals; and, there only, displays itself in the particular property of each species. Water-breathing animals inhabit water; air-breathing animals, the air; either being in it, on the earth, or at some distance from the earth. But few animals, namely, the Marine Mammalia, live under water, and breath atmospheric air.

The native country of each animal is situated in a certain position with regard to the limit of organic life, as well as to the level plains of the Torrid Zone. Every species of animals lives within certain limits, which are parallel to the snow-line, and the centre of organic life under the Equator. The corporeal and spiritual disposition of every animal is closely

connected with the respective position of the tract it inhabits ; nor can a sufficient knowledge of an animal's condition be learned, unless it be considered in its own peculiar and natural situation. The Polar Bear lives only on and between the frozen plains of the North Pole ; the Lion, only in Africa's burning deserts. The inhabitants of the snow-line, between the Tropics, never descend to the warm level ; nor do those of the level ascend to the snow-line : each altitude having its peculiar animals.

The Mammalia remain always in their native country, during the whole year ; but Birds are subjected to the change of seasons. They, for the most part, keep at a certain distance from the snow line ; and in the Northern Hemisphere, accordingly migrate, at the fall of the year, southward ; following the apparent motion of the sun, and flying from the approaching fall of snow ; but they return in the spring as fast as the receding snow-line will permit. Subjected to the caprice of nature, their dwelling-place is much limited ; although the very same species seem to extend over immense districts. A well-informed Naturalist ought not to leave those circumstances unattended to which are essential to the existence of life on earth ; that is, to Physiology. Nor does Natural History answer its purpose, when

furnishing either insufficient, or, what is much worse, incorrect explanations.

The native country of the more perfect animals is better known than that of many Genera of plants. Yet most Naturalists have hitherto paid but little regard to the altitude at which animals live above the level of the sea. Zimmermann himself has left this circumstance quite unattended to, in his excellent work on the Spread of Animals over the Earth. In his Map, accordingly, the Names of Mammalia of every Country appear in warm climates, and at the same latitude, without distinction; the inhabitants of the snow-line being confused with those of the Torrid Zone. To the Financier, who calculates only on what may be made of these animals for the use of man, this may be convenient; but the able Naturalist, as well as the Man of Letters, must startle when he sees creatures jumbled together which nature has designed to be for ever asunder. This, perhaps, is convenient for those who look only at the utility which can be made of animals for the human body. But the diligent Naturalist, as well as the Poet, cannot but be struck with the inconsistency of seeing such creatures associated as are eternally separated by nature. Humboldt is the only one who (in his Natural Picture of the Tropical

World) has placed the animals of that part of the earth conformably to the different altitudes at which they live above the level of the sea : but the true native country of other animals, which he has not enumerated, can be inferred only from properties observable in each individual.

SPREADING OF THE MAMMALIA.

The Marine Mammalia are met with in all the Seas of the world ; yet they are, more generally, natives of the Polar Seas ; where they are found in much greater numbers than the Quadruped Mammalia, in the vicinity of the snow-line, on dry land. Mammalia which are furnished with hands, such as Apes and Monkeys, belong to warm climates, spreading from the Torrid Zone over a small part of the Temperate Zone. The Quadruped Mammalia inhabit the main land, each within certain limits, from the snow-line to the Torrid Zone.

Of the MAMMALIA of the SEAS :

1. The Whale (*Balæna*) is peculiar to the icebergs and plains of the Frozen Sea, and extends much beyond the 80th degree of latitude. Individuals of this Genus are more seldom found in the Temperate and Warm Zones ; although they are diffused in the

seas of all parts of the world. They swim with such rapidity, that Lacepede compares their velocity to that of sound.

2. The Genus of the Spermaceti Whale (*Physeter*) chiefly inhabits the seas of the Southern Hemisphere, between the icebergs; but it is also found in the seas of all climates.

3. The Unicorn-Fish (*Monodon*) inhabits the same seas as the Whale, but is rarely to be met with in the middle of the Temperate Zone.

4. The Dolphin (*Delphinus*) is found in all seas, but particularly in the Polar Seas.

5. The Walrus (*Trichecus*) inhabits, in the greatest number, the seas of Spitzbergen, Greenland, Nova Zembla, Kamtchatka, &c., and similar regions in the Southern Hemisphere. It has sometimes happened that, in the vicinity of the 75th degree N.L., more than eight hundred Walrusses have been killed in seven hours. Species of this Genus, but not in great numbers, are met with in the Temperate and Warm Zones.

6. The Seal (*Phoca*) does not seem to extend so far between the icebergs of the Polar Seas as the Whale: some species of it, however, are found in both Hemispheres, in great numbers, in the Polar Seas, and also in the Temperate and Warm Zones. About Greenland, according to Crantz, there are five

species of Seals ; and Forster met with many Sea-Lions and Sea-Bears in the Frozen Seas of the Southern Hemisphere.

RUMINATING ANIMALS, according to their nature, are common to those parts of the earth of which the Grasses are native ; from whence they spread, in every direction, over the other tracts of the main land.

7. The Hart (*Cervus*) extends, in its various species, from the snow-line to the Torrid Zone. The Rein-Deer (*Cervus tarandus*), which belong to that Genus, are met with as far beyond the snow-line as Lichens are found growing on the snowy plains. They are the only ruminating animals in Greenland, Spitzbergen, and Nova Zembla ; and form, when domesticated, the riches of those Laplanders, who, in their nomade state, frequently possess numerous herds of them. After these, comes the Elk (*Cervus alces*) ; and, in the Old World, the common Hart, the Roe, and the Fallow Deer. Large Harts live in the grassy tracts of the Andes ; and the Mexican Roe, according to Humboldt, is met with in the region of the Palms and Plantain-trees.

8. The Camel (*Camelus*) inhabits, according to Humboldt, the grassy plains of the Andes. Flocks

of Vicunas, Alpacas, and Huanacos, swarm on the grassy plains ; in fact, up to the snow-line. The larger Lamas inhabit a lower region : and the two species of Camels of the Old World, which are the largest, are, in a wild state, peculiar to the warmer half of the Temperate Zone, and from thence spread to the Warm Zone. They are met with, as domestic animals, according to Gmelin, as far as the 56th degree of N. L. The native country of these animals is, according to such circumstances, and on account of the spreading of several species, the region of the Grasses.

9. The Ox Tribe (*Bos*) does not extend, in its various species, so far towards the snow-line as that of the Harts and Camels. Most species are found in vast numbers in the middle of the Temperate Zone, and thrive best in grassy marsh-lands. This remark particularly holds good in the common Ox and Buffalo tribes. In Europe, the common Ox tribes are found in Iceland, as domestic animals, beyond the 60th degree of latitude ; but they there decrease, both in size and beauty. Greenland and Kamtchatka are without such animals. In Asia, the Grunting Ox inhabits the warmer half of the Temperate Zone. The Musk-Ox, in North America, extends, of all the species of this Order, farthest towards the snow-line ; being plentiful in Hudson's Bay, in

the 73d degree. The American Buffalo is met with in the warmer part of North America, Buffaloes are found, in great numbers, in the warmer countries of the Temperate and Warm Zones: they, however, prefer shadowy forests, are fond of wallowing in marshes, and prosper, in temperate countries, equal to domestic animals: they therefore are not exclusively natives of the Torrid Zone. Agreeably to these observations, the region within the 40th and 45th degree of Northern Latitude has been represented as the native country of these animals.

10. The Genera of Sheep and Goats (*Ovis & Capra*) also extend, in some species, up to the snow-line. The Wild Sheep (*Ovis Ammon*) inhabit the lofty mountains of Greece, Sardinia, and Barbary; the Argali, according to Gmelin, the mountains of Siberia, from Irtisch to Kamtchatka; the Caucasian Goat, the Caucasus. The Ibex lives in the highest snowy mountains of Salzburg and the Pyrennees; and, according to Brown, in Jamaica. The astonishing agility which these animals display in climbing, indicates the regions to which they belong. The common Sheep occurs, as a domestic animal, on the shores of the Senegal, and in Iceland; but, according to Cranz, does not thrive in Greenland. The African Sheep (*Ovis Guineensis*) inhabits the tracts

of Lybia and the Senegal, but casts off its wool. The spread of these genera extends, of course, as far as the warm climates; but their native country, in their wild state, is the colder half of the Temperate Zone.

11. The Antelope (*Antilope*) is met with, in the greatest numbers, in the warmer half of the Temperate Zone; but extends as far as the Warm Zone: they approach very near to the snow-line, but do not reach it. Of these, the Chamois (*Antilope rupicapra*) inhabits the Alps; but descends, like the migratory birds, during the winter months, towards the dwellings of man: the *Antilope Scythica* migrates in a similar manner. In the Torrid Zone are the Gazelles: they are, principally, inhabitants of forests.

12. The Musk (*Moschus*) inhabits, for the most part, the lofty mountains of the Temperate Zone: for instance, the common Musk is to be found in China and Thibet. In those countries they nearly reach the snow-line; though some species, as the Pigmy Musk (*Moschus pygmæus*), extend to warm countries. The native country of these animals appears, therefore, to coincide with the plain level in the 50th degree N.L.; from whence they extend to the grassy regions on one side, and to the warm countries on the other.

13. The Horse (*Equus*) is common to the Tempe-

rate and Warm countries. The Wild Horse (*E. caballus ferus*) lives in the Deserts of Arabia, and in Java. The species of those Horses which, after being domesticated, have become wild, are to be met with in Russia, as far as the 52d or 53d degree N.L. The Wild Ass, the Zebra, and the Quagge inhabit warm countries only. Of all these species, the Cloven-Footed Horse (*E. bisulcus*) in Chili, and our common one, live only as domesticated animals toward the Frigid Zone. There are Horses in Iceland of a small size; but not any in Greenland, Kamtchatka, or Lapland. The district which, in the level, coincides with the 66° N.L., is accordingly to be regarded as a limit to the spreading of this Genus.

The Order of CARNIVOROUS ANIMALS (*Feræ*), although extending over all the Zones, yet displays its most horrible nature to the greatest extent under the scorching sunbeams of the Torrid Zone.

14. The Dog (*Canis*) spreads from the limit of perpetual snow to the Torrid Zone; in such a manner, that species of it occur in every degree of latitude, in both Hemispheres: but the most numerous and various kinds are natives of colder climates. The common Dog everywhere follows man. The Wolf (*C. lupus*), and the common Fox (*C. vulpes*),

are peculiar to the Temperate and Cold Zones. The Black Fox (*C. niger*), the Cross Fox (*C. cruciger*), and the Corsac (*C. corsac*), belong to cold countries. The Arctic Fox (*C. lagopus*) is numerous in Spitzbergen, Nova Zembla, on the Frozen Sea, and in Greenland; and lives beyond the limit of snow, in company with the Rein Deer and White Bear. The southern Arctic Fox (*C. antarticus*) is found in the Southern Hemisphere. The Jackall (*C. aureus*), and Hyenas, inhabit the Torrid Zone, and the contiguous parts of the Temperate. The former live in vast flocks in Syria, Persia, Arabia, Hindoostan, Bengal, Algiers, and Egypt.

15. The Bear (*Ursus*) is a native of the Cold and contiguous half of the Temperate Zone. The fiercest and largest of this Genus inhabit Spitzbergen, Nova Zembla, Greenland, the Icy Sea, and the Icy Plains of the Northern Polar Sea. The Glutton (*U. gulo*), and the Wolverine (*U. luscus*), live in the region of the 70th degree N.L. The former is met with in Lapland, according to Wahlenberg, 1500 feet below the snow-line. The Brown Bear (*U. arctos*), as well as the Black Bear in North America, inhabit the northern countries, or the lofty mountains of the more southern. In America, Bears are met with in the neighbourhood of the snow-line. Of all Bears, the

Grey in China, and the Small Bear with white forehead on the range of the Andes, spreads, according to Humboldt, nearest to countries of a warm climate. In America is to be found the Raccoon (*U. lotor*), also a native of warm countries; yet, as it is found in the 43d degree N.L., a region much colder than any European region in the same degree, it seems by no means to belong to warm countries, and probably inhabits mountains. We may therefore regard the region in the 30th degree N.L. as a limit to the spreading of those animals. It is curious, also, that the species of this Genus decrease, with regard to size and natural disposition, in the direction towards the warmer climates. The Polar Bear cannot support the warmth of the middle part of the Temperate Zone.

16. The Cat (*Felis*) is of a nature quite opposite to that of the Dog. It spreads, in its fiercest, largest, and most numerous species, over the hottest countries of the globe; decreasing in the Temperate Zone, with regard to number, size, and fecundity. The fiercest Cats, the Lion (*F. leo*), the Tiger (*F. tigris*), the Panther (*F. pardus*), the Great Leopard (*F. leopardus*), the Small Leopard (*F. leopardalis*), the Hunting Leopard (*F. jubata*), the Ounce (*F. uncia*), the Jaguar (*F. onca*), the Ocelot (*F. pardalis*).

lis), the Black American Lion (*F. concolor*), and some others, are peculiar to the Torrid Zone. The Lion is a native of Africa and Asia; but the Tiger, of Asia only. Towards the middle of the Temperate Zone, the Genus of these animals diminishes; the smaller kinds only being there met with. Of all species of the Cats, the Lynx in the Old World (*F. lynx*), the Wild Cat (but not numerous), and, according to Humboldt, the Small Lion on the Andes, are found nearly up to that region which coincides with the 65th degree towards the snow-line. In Kamtchatka, Greenland, Lapland, and Iceland, there are no Cats; nor does the Lynx, in Europe, extend farther than Norway.

17. Civets (*Viverra*), and the Weasel (*Mustela*), are so closely allied to each other, that they ought to be looked upon, in general, as being of the same Order of animals. The Civets are peculiar to the Torrid, and the warmer half of the Temperate Zones, yet extending beyond the middle, and approaching the colder countries. In Europe there is only one species of Civet; namely, the *Viverra zibetha*: the Polecat (*Viverra putorius*) inhabits America, Canada, and Virginia. According to Humboldt, the *Viverra mapurito* is found on the Andes, at an altitude of 9840 feet. We may therefore

consider that region, which, at the level of Europe, coincides with the 50th degree of Latitude, as the limit to the extension of this Genus of animals. Of the Weasels: the Martin (*Mustela foina*), and the Stoat (*M. erminea*), inhabit the warmer parts of Europe and Asia. The Ferret (*M. furo*) is met with in Barbary. These animals, however, are not peculiar to the Warm Zone; and even if they are found in the Moluccas, it is still a question, in what elevation, above the level of the sea, they inhabit. Most species of this Genus spread northward in great numbers, especially Sables, Ermines, Martins, Stoats, and the common Weasel; but, as they like woody tracts, they do not go further than where they meet with wood. They are, in general, peculiar to those countries which lie between the 30th and 70th degree of Latitude in the Northern Hemisphere.

18. Moles (*Talpa*), Shrews (*Sorex*), and Hedgehogs (*Erinaceus*), inhabit, in various species, partly the Temperate, and partly the Warm Zones; and are found even in the beginning of the Frigid Zone. The common Mole lives throughout Europe, in Barbary, and Northern Asia, as far as the River Lena. The Gold Mole is found at the Cape of Good Hope. The common Shrew inhabits Europe and Siberia; the Musk Shrew (*Sorex moschatus*), Asia, between

the 50th and 57th degree N.L.; the *S. Surinamensis*, Surinam; the *S. murinus*, Java. The common Hedgehog lives in the warmer parts of Europe: it is found in Norway, but neither in Lapland nor Iceland. The Tondrac inhabits Madagascar. These Genera of animals do not seem to go further than the 5th degree on this side of the snow-line.

19. Opossums (*Didelphis*) inhabit the warm countries of America and New Holland, in the Southern Hemisphere, extending nearly as far as the 40th degree S.L.

20. Bats (*Vespertilio*), Schreber believes, extend over the whole earth. It is however improbable that they should come near the snow-line, because they sleep, during the winter, in the Temperate Zone. The common Bat (*V. murinus*) extends to Norway; but in Lapland, Iceland, Greenland, Hudson's Bay, and on the tracts in the vicinity of the Frozen Sea, there are not any. Zimmermann supposes the limit to be in the 63d degree N.L. In our Picture it has been placed in the 65th degree.

DORMICE (*Glires*) are numerous in the Temperate Zone; become more so in the Torrid; and extend towards the snow-line, without reaching it; at least, no species is peculiarly common to the neighbourhood of the snow-line.

21. The family of Mice (*Mus*), Squirrels (*Sciurus*), and Hares (*Lepus*), are found in every part of the habitable globe. The common Hare (*L. timidus*) occurs throughout Europe. The Varying Hare (*L. variabilis*) inhabits the Snowy Mountains of Greenland, Lapland, Siberia, &c. The Alpine Hare is peculiar to the Alps. The Rabbit (*L. cuniculus*), lives in the middle and warmer part of the Temperate Zone; the Dwarf Hare (*L. nanus*) in North America; and the Brazilian Hare (*L. Brasiliensis*) in Brazil. Of the Mice Genus, the Rat follows the habitation of man in every direction; except in the cold countries, where they have the Lemmings (*Mus lemmus*), as in the snow-line of Scandinavia. The Root Mouse lives in Kamtchatka; the Hudson's Bay Mouse in Labrador. The Mountain Rats, which are related to the Mice, are inhabitants of the Alps; but sleep, during the winter, like the Hamesters; which circumstance clearly proves that they are not natives of cold countries. Of the Squirrels, the common one (*Sciurus Europæus*) spreads throughout Europe, and *Sc. Hudsonius* throughout Labrador. Some Flying Squirrels inhabit the colder countries of the Temperate Zone; others, warm climates. The Palm Squirrel (*Sc. palmarum*), and the Java Squirrel (*Sc. bicolor*) in Java, are inhabitants of the

Warm Zone. The Dormice (*Myoxus*), which are related to the Squirrels, are found in warm countries only, and sleep during the winter; from which circumstance their natural condition may be inferred. Agreeably to such considerations, the spreading of those animals has been represented in the Picture.

22. Beavers (*Castor*) live in the Northern Hemisphere only, belonging to the colder half of the Temperate Zone, between the 65th and 42d degree N. L. In Lapland, according to Wahlenberg, the last structures of Beavers along the rivers are found 3410 feet below the snow-line. They, in general, inhabit countries of the same character, in Europe, Asia, and America.

23. Cavies (*Cavia*) are peculiar to the New World, and chiefly to its warmer part. The Damans (*Hyrax*), related to the before-mentioned animals, extend to colder countries, as far as the snow-line. The Hudson's Bay Hyrax (*H. Hudsonius*) lives on the shores of Hudson's Bay.

24. Porcupines (*Hystrix*) are peculiar to the Warm Zone, and the contiguous parts of the Temperate Zone, in both Hemispheres. The Long-Spined Porcupine (*H. cristata*) occurs at the Cape of Good Hope, in Barbary, Palestine, Bucharía, Persia, China, Malacca, Java, Sumatra, and in the Southern part of

Europe. The only species extending beyond those countries, and living at Hudson's Bay, is the *H. dorsata*.

25. The Jerboas (*Dipus*) inhabits, for the most part, warm countries, and extends, in two species, as far as the 55th degree N. L. The Alaglala (*D. jaculus*), according to Pallas, does not occur beyond the 63d degree N. L. in Asia. *D. Hudsonius* lives in the vicinity of Hudson's Bay.

26. Swine, to which, besides the Genus of the Swine, belongs the Tapri in America; the Elephant, in Africa and Asia; the two species of Rhinoceros; and the Hippopotamos; are peculiar to the Warm and warmer half of the Temperate Zones. The Genus of the Swine is the most diffused; but it does not, in a wild state, extend beyond the 60th degree N. L. Domestic Swine are met with as far as the 63d degree of Latitude.

27. Sloths (*Bradypoda*) contain, besides the Genus of the Sloths, also that of the Ant-Eater (*Myrmecophaga*), the Mannis (*Manis*), and the Armadillos (*Dasypus*). They are altogether natives of the warm countries, not extending beyond the 30th degree of Latitude. The Genus of Sloths represents in the Picture the whole Order.

28. Handed Mammalia, Monkeys, and Apes are,

for the most part, (as before stated,) natives of the Torrid Zone; from whence they spread, in very small numbers, to the warmer part of the Temperate Zone. According to Humboldt, some Apes are found on the Andes, 6561 feet above the level of the sea. In the Northern Hemisphere, in Japan, there are Apes in the 37th degree of Latitude. In the Picture, their extension has, therefore, been designed from the Torrid Zone to the region of the 37th degree.

SPREADING OF BIRDS.

Marine Birds of both Hemispheres are most abundant in the Polar Seas, and are found at the utmost limits of organic life, among the icy plains. In such regions, where, on the land, but few Birds, and even those rare, are met with, the sea abounds with Water-Fowl. Many different species are known to be plentiful about Greenland, Spitzbergen, Kamtchatka, &c. Foster found, on the Southern Hemisphere, in the 54th degree of Latitude, near the Bird Island, large flocks of Sea-Ravens, Cormorants, Penguins, and other Sea-Fowl. The very thick covering of plumage with which the Sea-Birds are furnished, and the large mass of fat under their skin, accord with their abode.

1. On the Northern Hemisphere, the Auks (*Alca*)

inhabit the Frigid and Temperate Zones, almost between the 80th and 35th degree of Latitude : most of them do not pass beyond the 50th degree from the North. The *Alca pica* inhabits the Mediterranean only ; and the *A. cristatella*, the Seas of Japan.

2. On the Southern Hemisphere, Penguins (*Aptenodytes*, 'without wings') are found in the same regions which correspond with those inhabited by the Auks in the Northern Hemisphere. In some regions of the Frigid Zone, for instance, about New-Year's Island, according to Forster, they are most abundant, but less numerous between the Tropics.

3. The Terns (*Sterna*) spread over the whole sea, from pole to pole. They inhabit Spitzbergen (*S. hirundo*); Greenland, Kamtchatka, the Caspian Sea, (*S. Caspia*); Africa (*S. Africana*); Egypt, Surinam, (*S. Surinamensis*); Cayenne, New-Zealand, and Sandwich Land. Seven species are also reckoned to be natives of Germany.

4. Petrels (*Procellaria*) are found in the seas of the Cold and Temperate Zones of both Hemispheres, and appear to be less abundant in the Warm Zone. They are met with in the Southern Polar Circle (*P. gellida* and *glacialis*); on the icy plains near the North Pole (*P. furcata*); near Kamtchatka (*P. æquinoctialis*); in the 25th degree N.L. (*P. pella-*

gica); in the 37th s.l. (*P. marina*); between 47° and 58° s.l. (*P. cærulea*); in the 61st s.l. (*P. antarctica*.)

5. The Tropic Birds (*Phaëton*) take their name from their inhabiting the regions between the Tropics: they do not extend beyond that limit, nor are they numerous.

6. Albatrosses (*Diomedea*) inhabit the seas of the Frigid and Temperate Zones of both Hemispheres. The Wandering Albatross (*D. exulans*) is met with about Kamtchatka, at the Cape of Good Hope, and near Patagonia. They are also found in 37° s.l. (*D. spadicea*), and in 47° s.l. (*D. fuliginosa*).

7. Pelicans (*Pelecanus*) spread over the zones of both Hemispheres, and are found in fresh water as well as in the sea. The White Pelican (*P. onocrotalus*) inhabits the Northern, Temperate, and the Torrid Zones. Species of this Order are met with in Greenland, Iceland, Norway (*P. cristatus*); in Kamtchatka (*P. violaceus*); in Great Britain (*P. graculus*); in Germany, where there are five kinds; in China (*P. piscator*); between the Tropics (*P. aquilus*); in Jamaica, Barbadoes (*P. fuscus*); in the Philippines (*P. Philippensis*); in Cayenne (*P. fiber*, *P. parvus*); in New Zealand (*P. nævius*, *P. carunculatus*, *P. varius*); in Labrador (*P. Magellanicus*).

8. Gulls (*Larus*) seem to be peculiar to the

Northern Hemisphere. Several species inhabit the Frigid and Temperate Zones; as in Spitzbergen (*L. tridactylus*, *L. rissa*, *L. glaucus*); Greenland and Iceland (*L. fuscus*, *L. eburneus*, *L. canus*, *L. catarrhactes*, *L. parasiticus*); Norway (*L. argentatus*). Eight Gulls are also reckoned to be natives of Germany.

9. Cormorants (*Colymbus*) extend over the Cold and Temperate Regions, especially of the Northern Hemisphere; as, *C. triole*, *C. immer*, *C. arcticus*, *C. glacialis*, *C. borealis*, *C. septentrionalis*.

10. The *Mergus* is peculiar to the Temperate Zone.

11. The greatest number of Ducks (*Anas*) inhabit the sea shores, and also, in a smaller degree, the fresh water; and spread over the whole earth: yet they are more numerous in the Cold and colder half of the Temperate Zone than in the Torrid. Our common Goose (*A. anser*) is found, in a wild state, in several regions of both the New and Old World, throughout Europe, in Arabia, Persia, China, Japan, at the Cape of Good Hope, in New-Zealand, Labrador, and on the Falkland Islands. The Whistling Swan (*A. cygnus*) inhabits the extreme North; the Domestic Swan (*A. olor*) the northernmost parts of Russia and Siberia. In the Frigid Zone of the

Northern Hemisphere are found *A. hyperborea*, about Hudson's Bay, in Unalashka, and Kamtchatka; *A. grandis* in Kamtchatka and Siberia. Several species inhabit Africa, Ceylon, New-Zealand, the Falkland Islands, and Labrador. Humboldt found a great number of Ducks on Chimborazo, at the height of from 7000 to 10,000 feet. Thirty-nine species of this Genus are met with also in Germany.

Moor Fowls (*Grallæ*), which are closely allied to the Sea Birds, spread, in some species, over both Hemispheres, from the snow-line to the Torrid Zone; whereas, other Genera, although less numerous in species, are natural to warm countries only. This is chiefly the case in the Genus of the Flamingo (*Phænicopterus*), Spoonbill (*Platalea*), Jabiru (*Mycteria*), Bootbill (*Cancroma*), and the Trumpeter (*Psophai*), which is nearly related to the Herons. Of all these birds, the White Spoonbill (*Platalea leucorodia*) is the only one met with in the Temperate Zone, and in the Northern parts of Europe.

12. Herons (*Ardea*) are plentiful in the Temperate and Warm Zones. The common Rail is met with in most countries of Europe, and in North America. The Crane is found as high as the Polar Circle. The common Storks, in Europe, do not extend beyond Sweden; nor, in Russia, beyond the 50th degree of

Latitude. The Bittern (*A. stellaris*) approaches nearest to the Polar Circle. The other species are met with more to the South. Sixteen species of this Genus are found in Germany.

13. Rails (*Rallus*) are found, in some species, in both Hemispheres, but keep at some distance from the snow-line. The Landrail (*R. crex*) inhabits the Temperate Zone as far as Norway, and is seen even in Russia and Siberia. The Waterbill-Cock (*R. aquaticus*) does not, in like manner, leave the Temperate Zone. On the Southern Hemisphere, a species is met with (*R. obscurus*) in the Sandwich Islands, and the *R. troglodytes* in New-Zealand. Several species live in Cayenne, Jamaica, and similar regions.

14. Moor-Hens (*Fulica*) are closely related to that of the Rails; but appear, like that of the Pratincoles (*Glareola*), to be found only in the Northern Hemisphere. The common Moor-Hen (*F. atra*) inhabits the whole of the Old World, as far as Norway, Jamaica, Carolina, and Greenland.

15. The Plover (*Charadrius*) spreads over the zones of both Hemispheres, as far as the snow-line. The common Plover (*Ch. pluvialis*) is met with in Lapland, Iceland, Hudson's Bay, and in Labrador; the Grey Plover (*Ch. apricarius*), in Iceland, Greenland, and Hudson's Bay. Two species, *Ch. novæ Seelan-*

diæ, and *Ch. obscurus*, live in New-Zealand; and *Ch. fulvus* in Otaheite.

16. Snipes and Plovers (*Scolopax*) appear to be peculiar to the Northern Hemisphere, although not exclusively: they prefer the Cold and Temperate regions. Several of them are found far to the North; for instance, our Snipe (*S. rusticola*) breeds in Iceland, Kamtchatka, and Russia. The common Snipe (*S. gallinago*) is found as high as the Polar Circle. The Lapland Snipe inhabits the country from which it takes its name; the Pool-Snipe, Iceland and Greenland.

17. The Ibis (*Tantalus*), which is related to the Snipes, is rather numerous in warm countries, and hardly extends beyond the warmer part of the Temperate Zone.

18. Sandpipers (*Tringa*) are diffused in a similar manner to the Snipes. Our Lapwing (*T. vanellus*), and the Ruff (*T. pugnax*), are met with in Iceland also. Besides those, there are in Iceland, *T. ochropus*, *T. maritima*, *T. uniformis*, *T. striata*. *Tringa borealis*, and *T. variegata*, are found in King George's Sound; *T. alpina*, in Greenland, Iceland, and the Siberian Alps. About twenty-two species of this Genus are also natives of Germany.

19. Of the Land Birds, the Vulture (*Vultur*), and Falcon (*Falco*), which are of nearly the same species, extend over both Hemispheres, as far as the snow-line, and sometimes even farther. Vultures, however, are more numerous in warm countries, although some are found beyond the snow-line. Falcons, on the contrary, are more abundant in the Temperate and Frigid Zones, where they likewise reach beyond the snow-line. Germany numbers among its Birds three Vultures: viz. the Common (*Vultur cinereus*), the Crested (*V. cristatus*), and the Angola Vulture (*V. leucocephalus*); and thirty-seven Falcons, of which nine are Eagles.

20. The Owl (*Strix*) is spread over all the habitable parts of the globe; but none of any of its species are ever naturalized in the vicinity of the snow-line. The regions of Greenland and Newfoundland are their natural limits. Germany has fourteen species of this Genus.

21. The Butcher-Bird (*Lanius*) inhabits more generally the Warm and Temperate Zones, and never extends, as far as we know, to the Polar Circle on the Northern Hemisphere. Some species of them are seen in the Southern as well as the Northern Hemisphere; and the *L. Melanocephalus*, in par-

ticular, is found in the Sandwich Islands. Germany possesses four species.

22. The numerous family of PARROTS (*Psittacus*) inhabits the Torrid Zone, and hardly extends beyond the Tropical regions.

23. The Toucan (*Ramphastos*) inhabits South America, on this side of the Tropic.

24. The Hornbill (*Buceros*) is met with in the Old World, in the nether region of the Tropic. One species is found in New Holland also.

25. Ravens (*Corvus*) are spread over both Hemispheres, like Owls and Therns. The Common Raven (*C. corax*) is found on the Northern Hemisphere, as far as Greenland; on the Southern, in the Sandwich Islands, and at the Cape of Good Hope. Germany possesses ten species of this Genus.

26. The Roller (*Coracias*), on the contrary, does not reach so far towards the snow-line; yet the Common Roller (*C. garrula*) is met with in Sweden.

27. In like manner are spread the families of the Cuckoo (*Cuculus*), the Wryneck (*Yunx*), and the Woodpecker (*Picus*). Of the latter kind, the Black Woodpecker, the Ox-Eye Creeper, and the greater Spotted Woodpecker, are found in Lapland; and

the *Picus tridactylus*, in Kamtchatka. Woodpeckers in general inhabit warm countries; as, Surinam, Mexico, Jamaica, &c. Germany has eight kinds. The Wryneck is met with from Lapland to Bengal. The Genus of Cuckoos is particularly abundant in the Torrid Zone: in Germany there are two species, which are natives, the Common and the Sad-Red Cuckoos; the former appears to be a native of most European countries.

28. Of the family of the Nut-hatches (*Sitta*), one species only spreads through Sweden and Kamtchatka (*Sitta Europæa*). All the other species (more than ten) inhabit warm countries.

29. Of Bee-Eaters (*Merops*), the common one (*M. apiaster*) spreads Northward to Sweden, and Southward to Arabia. Besides which, the Yellow-headed Bee-Eater (*M. congener*) swarms from the southern parts of Europe to Germany. Others (more than twenty) inhabit the warmer regions of the Old World.

30. Of the family of the Hoops (*Upupa*), the common species are found in Europe, as far as Lapland, and also in Asia and Africa. The others (about ten species) are inhabitants of the Torrid, and the contiguous parts of the Temperate, Zones.

31. Of the Creepers (*Certhia*), the common species

(*C. familiaris*) are met with in Europe, up to Sandmor, and in the forests of Russia and Siberia. Germany has the Spidercatcher (*C. muraria*). The other species (more than seventy-six) are inhabitants of the warmer regions, on each side of the Equator.

32. Humming-Birds (*Trochilus*), which are related to the Creepers, are all inhabitants of America, and particularly of the Torrid, and contiguous parts of the Temperate, Zones. There are about sixty-seven species known. The Ruffed Colibri (*T. rufus*) is the only one found in Canada; and the Common Colibri, in Carolina. Humboldt found Colibris on Chimborazo, as high as 14,000 feet above the level the sea.

33. The family of the Todies (*Todus*) is peculiar to warm countries, and, for the most part, to America.

34. Birds of Paradise (*Paradisea*) inhabit the hot countries, within a few degrees of the Equator, and are more particularly common in New Guinea. There are nine species of them known.

35. The Curucuis (*Trogon*), which also comprehends nine species, and the Barbets (*Bucco*), eighteen species, are confined to the Torrid Zone; and but few species of them pass beyond the Tropical regions.

36. The Grakles (*Gracula*), which comprehend about twelve species, spread from the Torrid Zone

over the contiguous parts of the Temperate one only. They are not natives of Europe.

37. The family of Kings'-Spears (*Alcedo*) is spread over the whole world, but are most numerous in warm countries. Of twenty-seven species, *A. ispida* is the only one natural to Germany; inhabiting besides, Europe, Asia, and Africa, without reaching the cold countries.

38. The family of Oriole (*Oriolus*) comprehends forty-seven species; of which, the Common Oriole (*O. galbula*) only is to be found in Germany as a bird of passage, which it quits as early as August. One species (*O. unalaskensis*) is found in Unalaska; and the Green Oriole (*O. viridis*) at Hudson's Bay. All the other species keep near the warm countries.

39. The family of Goatsuckers (*Caprimulgus*) is met with, according to Humboldt, near the snow-line on Chimborazo. The European Goatsucker is found also in Siberia and Kamtchatka: they are, nevertheless, natives of warm countries

The family of SPARROWS (*Passeres*) is diffused over the whole of the inhabitable parts of the globe. They are less numerous near the snow-line than in the Temperate Zone; but most abundant in the Warm Zone. Of Finches, Wagtails, Larks, Ham-

mers, and Thrushes, some are met with near the snow-line, or in its neighbourhood.

40. Of all the Finches, the Snow-Bunting (*Emberiza nivalis*) extends the farthest beyond the snow-line. It is met with in flocks in Spitzbergen and the neighbouring Icy Plains; and is found in Lapland, according to Wahlenberg, 2100 feet above the limit of snow, where it is the only living animal found. Our Yellow-Hammer (*E. citrinella*) spreads throughout Europe. Several species of this Genus inhabit the Temperate, and many of them the Warm Zones. There are seventy-eight species known; nine of which are natives of Germany.

41. The family of Finches (*Fringilla*) is very abundant in the colder part of the Temperate Zone: in Germany there are, together with the Fiskins, fourteen species of them. The Snowfinch (*F. nivalis*) inhabits the snowy summits of the Caucasus and Persian Mountains; the Lapland Finch (*F. lapponica*) Lapland, Greenland, the middle part of Siberia, and Hudson's Bay; the Arctic Finch (*F. flavirostris*) is common to Norway, and the north-east parts of Siberia. Our House-Sparrow (*F. domestica*) is common throughout Europe, and in Egypt, Senegal, Syria, and other regions of Asia and Africa. Our Chaffinch (*F. cælebs*) inhabits the whole of Europe.

There are one hundred and sixteen species; many of which inhabit the warmer part of the Temperate and the Torrid Zones.

42. The family of the Wagtails and Nightingales (*Motacilla*) comprehends almost two hundred species; of which, at least, twenty-nine, or, if Hedge-Sparrows be included, thirty-two, species are found in Germany; most of them are natives of warm countries. Our Nightingale (*M. lusciniæ*) is met with throughout Europe, from Sweden to Greece, and also in Siberia. The Alpine Hedge-Sparrow (*M. alpina*) inhabits the Alps of Carinthia, Ukraine, Auvergne, and Dauphiné. The Wren (*M. troglodytes*) is met with throughout Europe; and also in Unalaska, and at Aleppo.

43. The family of Cherryfinch (*Loxia*) comprehends almost one hundred species, and extends from the Temperate to the Warm Zones. Six species only are known in Germany. The Caucasian Cherryfinch (*L. rubicilla*) is met with in the coldest tracts of the Caucasian Mountains, and approaches nearest to the snow-line.

44. The family of the Thrush (*Turdus*) is diffused in a similar manner. Of one hundred and thirty-five species hitherto known, there are only ten in Germany. Lapland, Kamtchatka, Hudson's Bay, and corresponding regions in the Southern Hemi-

sphere, appear to be those tracts to which they extend. They are, like the *Loxia*, diffused over both Hemispheres, but most numerous in warm countries.

45. The family of Starlings (*Sturnus*) is less numerous. The Common Starling spreads farthest on the Northern Hemisphere, and is plentiful in Iceland.

46. The same may be observed of the family of Chatterers (*Ampelis*). The only species in Germany (*A. garrulus*) lives in the vicinity of the Northern Polar Circle. The remaining species known (twelve) inhabit warm countries.

47. The family of Larks (*Alauda*), of which, in the whole, there are thirty-four species, although only eight of them are known, inhabit the warm countries. The Alpine Lark (*A. Alpestris*) appears to approach nearest to the snow-line. Our Field Lark (*A. arvensis*) is found in Kamtchatka. Their spreading has, therefore, been described up to the 50th degree on this side of the snow-line.

48. The Titmouse (*Parus*) is not a migratory bird. Eight species of the thirty which are known inhabit Germany; of which, the Ox-Eye (*P. major*) spreads from Sweden to the Cape of Good Hope. The Crested Titmouse (*P. griseus*) inhabits Greenland; the Amorous Titmouse (*P. amatorius*), the northern regions of Asia; and the Mountain Titmouse (*P. alpinus*), Persia's lofty Mountains. They are, in

general, common to the Temperate Zone; and their extension has been said to reach the 5th degree below the snow-line.

49. The family of Swallows (*Hirundo*) spreads in thirty-eight species over the Frigid, Temperate, and Warm countries. Our Chimney Swallow (*H. domestica*) is found from Norway to the Cape of Good Hope; from Kamtchatka to India and Japan; and in all the regions of North America. The House-Martin (*H. urbica*) is found in Europe and America: the Swift-Martin (*H. apus*) inhabits the whole of Europe, and is met with at the Cape of Good Hope, and in North America. Unalaska possesses also a peculiar species of Swallow. The Alpine Swallow (*H. melba*) is found on the Alps.

50. Of the family of Flycatchers (*Muscicapa*), which comprehends more than one hundred species, but few are natives of the colder half of the Temperate Zone, and even these are only found in single numbers. Four or five species are also in Germany. The Spotted Flycatcher (*M. grisola*) does not reach farther than the 55th degree N.L.; and the second species, which is peculiar to Germany (*M. atricapilla*), does not appear beyond Sweden. Yet there are probably two species in Kamtchatka.

51. The Colies (*Colius*), which are allied to the

Cherryfinches, and consist of eight species, and also the Manakins (*Pipra*) of twenty-nine species, are peculiar to warm countries; and do not extend above the 30th degree of latitude.

52. The family of Tanagers (*Tanagra*), which is related to the Hammers, is confined to the Warm, and to the contiguous parts of the Temperate, Zone. Only one species (*T. rubra*) is found in North America.

Of the family of HENS (*Gallinæ*), Partridges and Woodcocks (*Tetrao*) are the only species diffused over all the zones, and met with near the snow-line. All the other Genera become more numerous in the warmer part of the Temperate Zone, but are found most plentiful in the Torrid Zone.

53. Of the seventy-one known species of Partridges and Wood-hens, the largest extend numerously over the Cold and contiguous parts of the Temperate Zone. The Heath-cock inhabits the cold countries of Europe and Asia, and the Alps of the Temperate Zone. The Heath-hen has also the same range. The White Grouse (*Tetrao lagopus*) is found partly on the Alps, and partly in the Polar countries; for instance, in Greenland, near the snow-line. The Lapland Grouse (*T. Lapponicus*) inhabits the mountains of Lapland. The Hazel Grouse (*T. bonasia*)

belongs to the inhabitants of the Alps. Partridges are natives of Temperate countries; but Quails are particularly common to warm countries.

54. Of Bustards (*Otis*), the Great Bustard (*O. tarda*) extends only northwards, and not farther than Sweden or Russia; but is met with towards the South, as far as Greece and Syria. The other eleven species of this Genus inhabit the warmer parts of the Temperate Zone. Besides the great Bustard, there is in Southern Germany the little one also. The Ruffed Bustard alone is found in Silesia.

55. Of the family of Pigeons (*Columba*), the Wood-Dove, Ring-Dove, and Turtle-Dove, are natives of the Old World, and extend nearly as far as the 60th degree of latitude: and in America the Wood-Pigeon (*C. migratoria*) likewise reaches the 60th degree. The Wood-Dove is met with in Sweden, and the southern parts of Russia. The Ring-Dove lives in Sweden, but not in Norway. The Turtle-Dove keeps more southward. Of the other Pigeons (nearly seventy-seven species), the handsomest, most numerous, and largest, extend towards the warm countries.

56. The family of Pheasants (*Phasianus*) does not extend beyond the 46th degree of latitude. The Domestic Hen, which belongs to that family, lives in

Greenland, but does not breed there, nor in any other cold country. It is found, in its wild state, in the forests of India. The other species of that family, of which only fourteen are as yet known, are natives of the warmer climates.

57. Of the family of Turkeys (*Meleagris*), the Grey Turkey is met with in America in a wild state : but it does not appear, from its tender disposition when domesticated, to belong to cold countries. The other species (about five) inhabit warmer countries.

58. The family of Pintados (*Numida*) is more peculiar to warm countries. The common Guinea Hen is found in a wild state at the Cape of Good Hope; others inhabit similar regions. Four species only are known.

59. The family of Peacocks (*Pavo*) does not, in a wild state, extend beyond the 30th degree of latitude. Four species only are known. The Common Peacock is found in a wild state in several countries of Africa and Asia; for instance, on the Ganges.

60. The family of the Curassous (*Crax*), of which eight species are known, as well as the Ostrich and Cassowary, inhabit solely the Torrid Zone, hardly extending beyond the Tropics.

SPREADING OF THE AMPHIBIA.

The Amphibia of the Torrid Zone are the largest, the most frightful, and the most numerous. In the Temperate Zone they become smaller, and less numerous; and cease altogether at the Frigid Zone.

1. Of all Amphibia, Frogs and Toads are most numerous in the colder portion of the Temperate Zone; and are found in the Northern Hemisphere, between the 50th and 60th degrees of latitude, in greater number than Snakes and Lizards. Although the largest species of this Genus are natives of the Warm Zone, as the Argus Frog (*Rana ocellata*) in the warmer part of America; yet they seem to be particularly common to the Temperate Zone. How near they approach to the snow-line cannot be ascertained; but, as they grow stiff by cold, their native country cannot be in the neighbourhood of the snow-line. In Greenland there are neither Frogs nor Toads. The Green Frog (*R. esculenta*) is met with in Lapland; and the Brown Frog in most European countries. As these animals, when transformed from water-breathing fish to air-breathing animals, gain a more perfect life than fish have, they may extend farther towards the snow-line than fish which inhabit fresh water. In

the Picture, the region in the 5th degree, on the nether side of the snow-line, is marked as a limit beyond which they do not extend.

2. After Frogs and Toads, Lizards are most numerous in the direction of the snow-line. Their native country, however, is beyond doubt in the Torrid Zone, because in that region they attain their greatest size (viz. the three species of Crocodiles): they are there more numerous, handsomer, and more lively; and in winter they do not become torpid. The Green Lizard (*Lacerta agilis*) is supposed to be met with all over Europe, but most probably in small numbers in cold countries. According to such observations, the region in the 9th degree, on this side of the snow-line, has been given as the limit of their spreading.

3. After the Lizards, follow Snakes. Most of them, including the Boa, and those which are poisonous in a high degree, are natives of the Torrid Zone. Yet there are some to be met with in the colder part of the Temperate Zone: the Ringed Snake (*Coluber natrix*), as well as the Blind Worm (*Anguis fragilis*), is supposed to spread throughout Europe. According to Crantz, there are no Snakes in Greenland. They are less numerous in colder climates than Lizards. According to such obser-

vations, the region 10 degrees on the nether side of the snow-line has been given as the limit of their spreading.

4. The family of Tortoises is peculiar to the warm part of the Temperate Zone. The Marine Tortoise does not extend beyond the 40th degree of latitude in the Northern Hemisphere. Most of them, and the largest, particularly the Green Turtle (*Testudo mydas*), are found in the seas between the Tropics only. Those species which inhabit rivers and the main land are removed somewhat further from the warm countries; yet, the region in the 50th degree of latitude, on the Northern Hemisphere, may be regarded as the limit of their spreading. In Silesia Mud Tortoises are met with in small numbers. According to such observations, the line of the spreading of the Marine Tortoise has been extended to the 40th degree: whilst the limits of the species which inhabit rivers and the main land, extend as far as the 50th degree.

SPREADING OF THE OTHER ANIMALS.

1. All Fish, inhabitants of the sea as well as inhabitants of fresh water, gradually increase in regard to number, size, appearance, and quickness, from the cold to the Temperate Zones, and from

thence to the Torrid Zone. As the snow-line of the sea, however, begins in a higher degree of latitude than that of the main land, the Marine Fish approach much nearer to the Poles than those inhabiting fresh water on the main land are enabled to do. The Alpine Trout (*Salmo Alpinus*) according to Wahlenberg, is not met with further than 2100 feet below the snow-line in Lapland, nor is any fish to be found in a higher latitude. The Gwiniad, or Dace (*Salmo lavaretus*), and the Grayling (*Salmo thymalus*), are not found more than 3150 feet below the snow-line. This accords with Humboldt's observations, who, with Bonpland, did not find any fish in the lakes of Chimborazo at a height of 17500 feet. According to such observations, the line of the spreading of the fresh-water fish has been drawn as far as 70° on this side of the snow-line. The snow-line of the sea lies more than 5° nearer the Pole; and fish spread as far as the water runs: at least they are met with about Spitzbergen. The line of the spreading of the Marine fish has been, on that account, drawn about 5° beyond that region where, on the main land, the snow-line lies.

2. The limit to the spreading of Insects cannot be ascertained. Most of them, and the handsomest and largest, are found in the Torrid Zone; and their native country lies not beyond the snow-

line. Winged insects, however, pass sometimes beyond the snow-line. Humboldt and Bonpland saw insects in the snowy regions of Chimborazo; and Saussure met with some on the snowy region of Mont Blanc. As some winged insects live but a very short time, and become stiff with cold, without dying, it is easy to conceive why, in cold countries, as in Greenland and Lapland, several insects exist. According to such observations, the line of the extension of the insects has been drawn 2° beyond the snow-line.

3. How far Crabs and Shell-Fish are diffused, cannot be ascertained: but they probably are met with on the Southern Hemisphere, beyond the 80th degree of latitude, being food for Whales. According to Crantz, there are a great number of Crawfish and Squills in Greenland.

4. The Snails and Worms of the main land and fresh water are not diffused beyond the snow-line, as they are unable to live there: how near they approach to it cannot be ascertained; yet some of them are of a tenacious disposition, and are more numerous in the Temperate than in the Torrid Zone. The line of their spreading has been accordingly drawn up to the 3d degree on this side of the snow-line.

5. The Molluscs and Worms of the sea are most plentiful within the Tropics, where they grow the largest, and are furnished with the handsomest shells: but Zoega caught *Nereides* in the sea about Iceland; where Koenig also met with *Aphrodites*, and particularly *Amphitrites*, in large quantities. Several shells are found, according to Crantz, in the seas about Greenland. They of course spread beyond that region where the snow-line on the main land touches the earth, but how far has not yet been ascertained.

6. The Zoophytes of the sea, and especially the Coral Polypes, are peculiar to the seas between the Tropics, where the beds of Coral gradually increase so as to form Islands. According to Koenig, some Zoophytes are found in the sea about Iceland; and Sea-Pads and Sea-Urchins, according to Crantz, are met with near Greenland. They, however, in all probability, do not spread beyond those regions.

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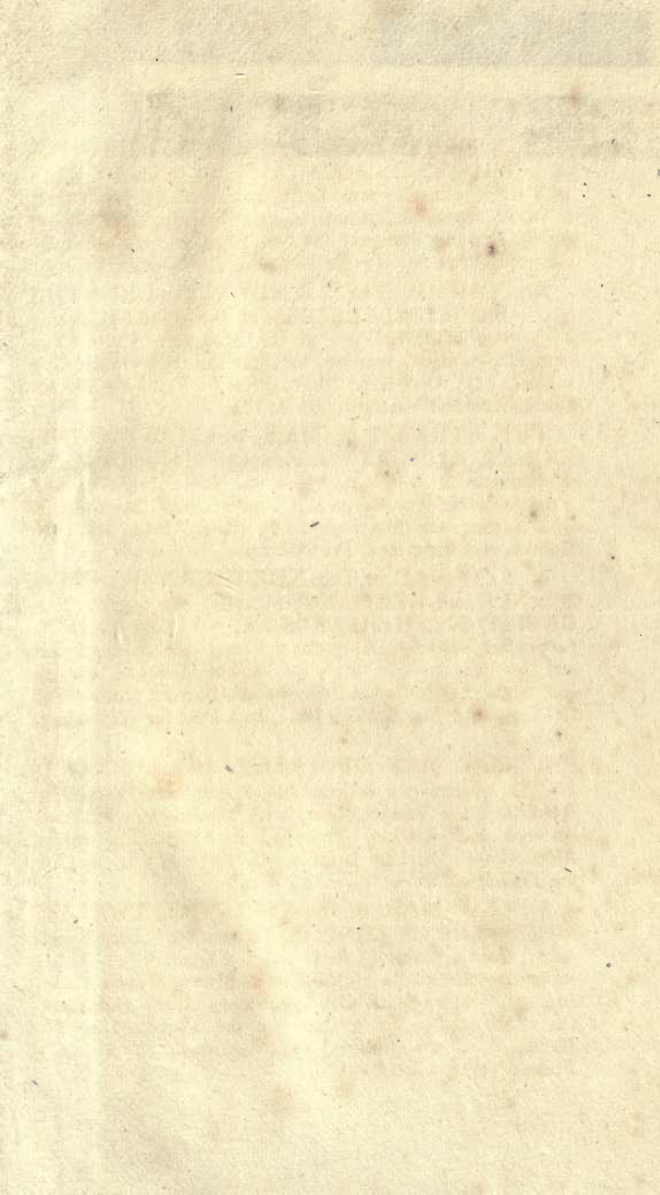
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